



Leader in
Level Measurement

Installation and Operating Instructions

IntelliPoint RF™ RML Series
Point Level Switch
with Manual Calibration/Set Point

Telephone: 1 215-674-1234
Fax: 1 215-674-2731
E-mail: drexelbrook.service@ametech.com
Website: www.drexelbrook.com

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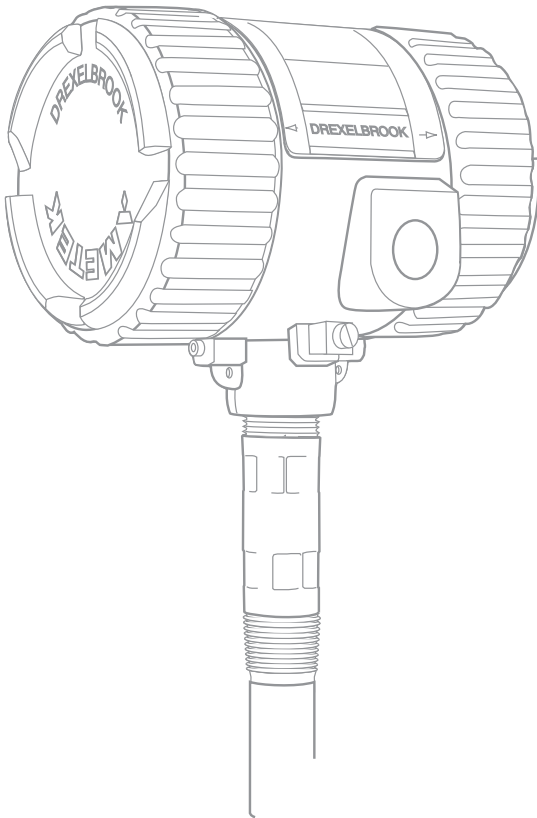
205 Keith Valley Road, Horsham, PA 19044
Telephone: 1 215-674-1234
Fax: 1 215-674-2731
E-mail: drexelbrook.service@ametek.com
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Section 1

Section 1: Introduction

1.1 System Description

The AMETEK Drexelbrook, **IntelliPoint RML and RGL Series** point level switches detect the presence or absence of material and provide a relay output for control functions. The RML and RGL IntelliPoint switches are calibrated through a simple potentiometer adjustment.

Since the IntelliPoint RML Series requires calibration and setpoint adjustments, it is not capable of operating in non-dedicated tanks.

1.2 Technology

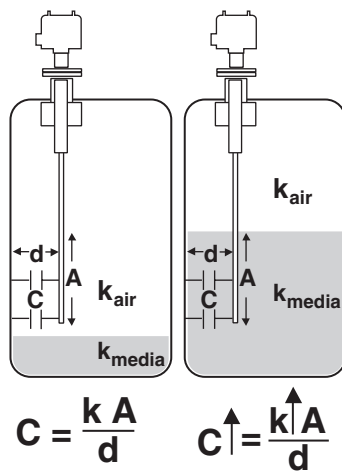


Figure 1-1
Simple Capacitance Probe

In a simple capacitance probe-type sensing element, when the level rises and material covers the probe, the capacitance within the circuit between the probe and the media (conductive applications), or the probe and the vessel wall (insulating applications), increases. This is due to the dielectric constant (k) of the material which causes a bridge imbalance. The signal is demodulated (rectified) and amplified, then the output is increased. There are drawbacks, however, especially when there is coating of the probe.

An RF Admittance level transmitter is the next generation. Although similar to the capacitance concept, IntelliPoint employs a radio frequency signal and adds the Cote-Shield circuitry within the Electronics Unit. This patented Cote-Shield circuitry is designed into the IntelliPoint series and enables the instrument to ignore the effect of buildup, that is, material coating on the sensing element. The sensing element is mounted in the vessel and provides a change in RF admittance indicating the presence or absence of material.

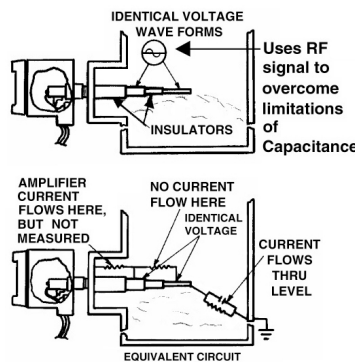


Figure 1-2
RF Admittance Probe with Cote-Shield

The Cote-Shield element of the sensor prevents the transmission of RF current through the coating on the sensing element. The only path to ground available for the RF current is through the material being measured.

The result is an accurate measurement regardless of the amount of coating on the probe, making it the most versatile technology available by far. Not only does it work with all types of materials, it's well suited to a very broad range of conditions, from cryogenics to high temperature, from vacuum all the way to 10,000psi pressure.

1.3 Model Number

Technology					
R	RF Admittance				
Measurement Type					
M	Manual Calibration				
G	Manual Calibration (High Sensitivity)				
Input					
L	Universal Power Supply 21-100 VDC, 85-250 VAC, 0-400 Hz				
Housing					
0	No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries				
1	No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries				
2	ATEX Approved, NEMA 4X/IP66, M20 X 1.5 conduit entries				
3	FM/FMc Approved, NEMA 4X/IP66, ¾" NPT conduit entries				
5	No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries, Dual Seal, Perm-a-Seal sensors – only				
6	No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only				
7	FM/FMc Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Perm-a-Seal sensors – only				
9	No Approvals, NEMA 4X/IP66, M20 X 1.5 conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
A	No Approvals, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
B	FM/FMc Approved, NEMA 4X/IP66, ¾" NPT conduit entries, Dual Seal, Non Perm-a-Seal sensors – only				
Electronics					
0	Integral	7	Rmt. w/ (25 ft.) Tri-Ax Cable	E	Rmt. w/ (75 ft.) 1st 10ft Hi-Temp. Cbl.
1	Remote, no cable	8	Rmt. w/ (50 ft.) Tri-Ax Cable	F	Rmt. w/ (5 ft.) G.P. Cable
2	Rmt. w/ 3 m (10 ft.) G.P. Cable	9	Rmt. w/ (75 ft.) Tri-Ax Cable	G	Rmt. w/ (5 ft.) Tri-Ax Cable
3	Rmt. w/ 7.6 m (25 ft.) G.P. Cable	A	Rmt. w/ (10 ft.) Hi-Temp. Cable	H	Rmt. w/ (10 ft.) Tri-Ax Cable
4	Rmt. w/ 10.6 m (35 ft.) G.P. Cable	B	Rmt. w/ (25 ft.) 1st 10ft Hi-Temp. Cbl.	J	Rmt. w/ (35 ft.) Tri-Ax Cable
5	Rmt. w/ 15.2 m (50 ft.) G.P. Cable	C	Rmt. w/ (35 ft.) 1st 10ft Hi-Temp. Cbl.	K	Rmt. w/ (5 ft.) Hi-Temp. Cable
6	Rmt. w/ 23 m (75 ft.) G.P. Cable	D	Rmt. w/ (50 ft.) 1st 10ft Hi-Temp. Cbl.		
Output					
1	Two SPDT Relays, relay #2 configured as alarm or fault (Min=100 mA / 12 VDC)				
2	Two SPDT Relay, gold plated contacts (Max 200 mA / 12 VDC)				
Sensing Element					
	Application	Sensing Element	Pressure/Temperature	Wetted Parts	
00	General purpose	700-1202-001 remote 700-1202-021 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK	
01	Floating roof with cable attachment and brass bottom weight	700-1202-012 remote 700-1202-022 integral	13.8 bar @ 177°C (200 PSI @ 350°F)	316SS, Brass, and PEEK	
02	General purpose, longer insertion lengths with cable attachment and 316SS bottom weight	700-1202-014 remote 700-1202-024 integral	13.8 bar @ 177°C (200 PSI @ 350°F)	316SS and PEEK	
03	Proximity	700-1202-018 remote 700-1202-028 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK with 76 mm (3) 316SS proximity plate 316SS and PEEK	
04	General purpose, high temperature and pressure	700-1202-041 remote 700-1202-042 integral	69 bar @ 121°C (1000 PSI @ 250°F) 20.7 bar @ 232°C (300 PSI @ 450°F)	316SS and PEEK	
06	General purpose with FDA approved materials of construction	700-1202-031 remote 700-1202-032 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and FDA grade PEEK	
07	General purpose Granular materials	700-1202-010 remote 700-1202-020 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and PEEK with 7/8 inch dia. 316SS collar	
09	General purpose Granular materials with FDA approved materials of construction	700-1202-033 remote 700-1202-034 integral	13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and FDA grade PEEK with 7/8 inch dia. 316SS collar	
10	Corrosive liquids (2)(4)(9)	700-0001-018 remote	3.4 bar @ 149°C (50 PSI @ 300°F)	PFA	
11	General purpose, higher pressure TFE compatibility required	700-0201-005 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and TFE	
12	Corrosive material, higher pressure	700-0201-005 int/rem Hastelloy C	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	Hastelloy C and TFE	
13	Sanitary (3)	700-0201-036 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 300°F)	316/316L SS and TFE	
14	General Purpose, low pressure	700-0202-002 int/rem	3.4 bar @ 149°C (50 PSI @ 300°F) 1.4 bar @ 232°C (20 PSI @ 450°F)	316SS and TFE	
15	Heavy duty, agitated tanks or material with high bulk density (1)	700-0202-043 remote	69 bar @ 38°C (1000 PSI @ 100°F) 13.8 bar @ 232°C (200 PSI @ 450°F)	316SS and TFE	
16	High Integrity Seal for Hazardous Materials	700-0002-360 int/rem	34.5 bar @ 149°C (500 PSI @ 300°F)	PFA	
17	Sanitary (3) lowpressure	700-0202-036 int/rem	3.4 bar @ 149°C (50 PSI @ 300°F)	316SS and TFE	
18	Corrosive material, higher pressure with waterlike viscosity (4)	700-0001-022 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	TFE	
19	Interface Measurement	700-0002-023 int/rem	69 bar @ 38°C (1000 PSI @ 100°F) 34.5 bar @ 149°C (500 PSI @ 300°F)	316SS and TFE	
20	Miniature Pilot Plant Sensor (1)(7)	700-0209-002 remote	6.9 bar @ 121°C (100 PSI @ 250°F) 0 bar @ 232°C (0 PSI @ 450°F)	316 SS and TFE	
Fly Ash Precipitators, Baghouse, and Economizers (1) (6)					
	Application	Sensing Element	Pressure/Temperature	Wetted Parts	
31	No hopper Installation	700-0029-001 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE	
32	Hopper Installation up to 200mm (8 inches)	700-0029-002 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE	
33	Hopper Installation up to 406mm (16 inches)	700-0029-003 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE	
34	Hopper Instalation up to 521mm (20.5 inches)	700-0029-004 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE	
35	Hopper Installation up to 635mm (25 inches)	700-0029-005 remote	0.1 bar @ 260°C (2 PSI @ 500°F)	316SS and TFE	

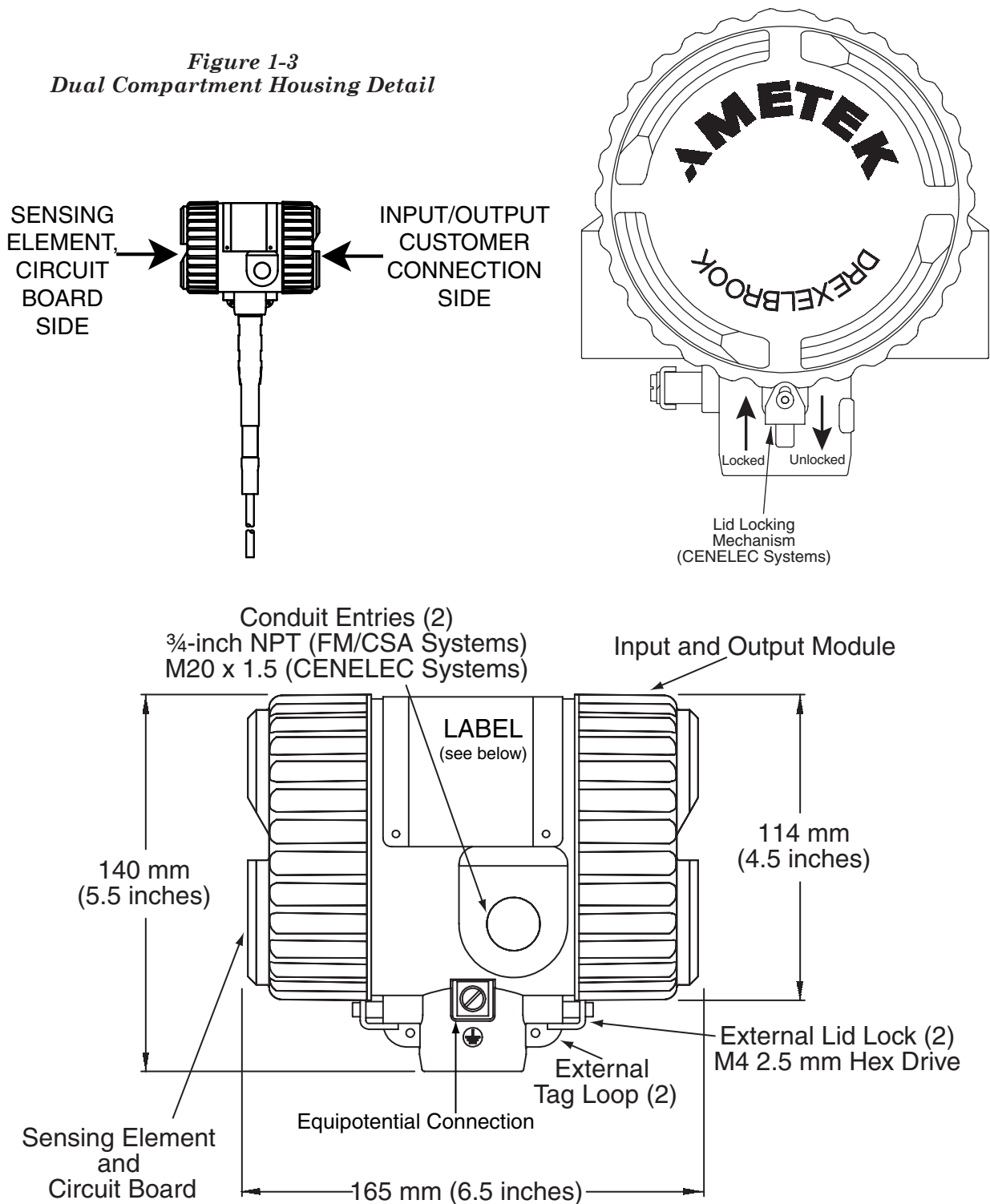
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3

1.4 Dual Compartment Housing

Figure 1-3
Dual Compartment Housing Detail



The Input/Output Module (IOM) is located on Customer Connection side; sensing element/circuit board are on opposite side.

Section 2: Installation

2.1 Unpacking

Carefully remove the contents of the shipping carton and check each item against the packing list before destroying any packing material. If there is any shortage or damage report it to the factory immediately.

2.2 Mounting and Installation Guidelines

The IntelliPoint RF instrument can be mounted vertically, horizontally, or at an angle. The mounting location should be as free as possible from vibration, corrosive atmospheres, and the possibility of mechanical damage. Ambient temperatures at the electronics should be between -30 to 70°C (-22 to 158°F).

The IntelliPoint RF utilizes a dual compartment housing and a completely encapsulated input/output module, to reduce the possibility of damage occurring from water migrating into the housing through the conduit.

To further reduce the possibility of damage caused by water in the conduit, install a drip loop and breather drain to purge any accumulating moisture. Refer to **Figure 2-1**.

When properly installed, the GREEN LED will illuminate when power is applied. The two (2) RED LEDs should not be flashing.

If either of the RED LEDs are flashing, refer to Section 4, Troubleshooting.

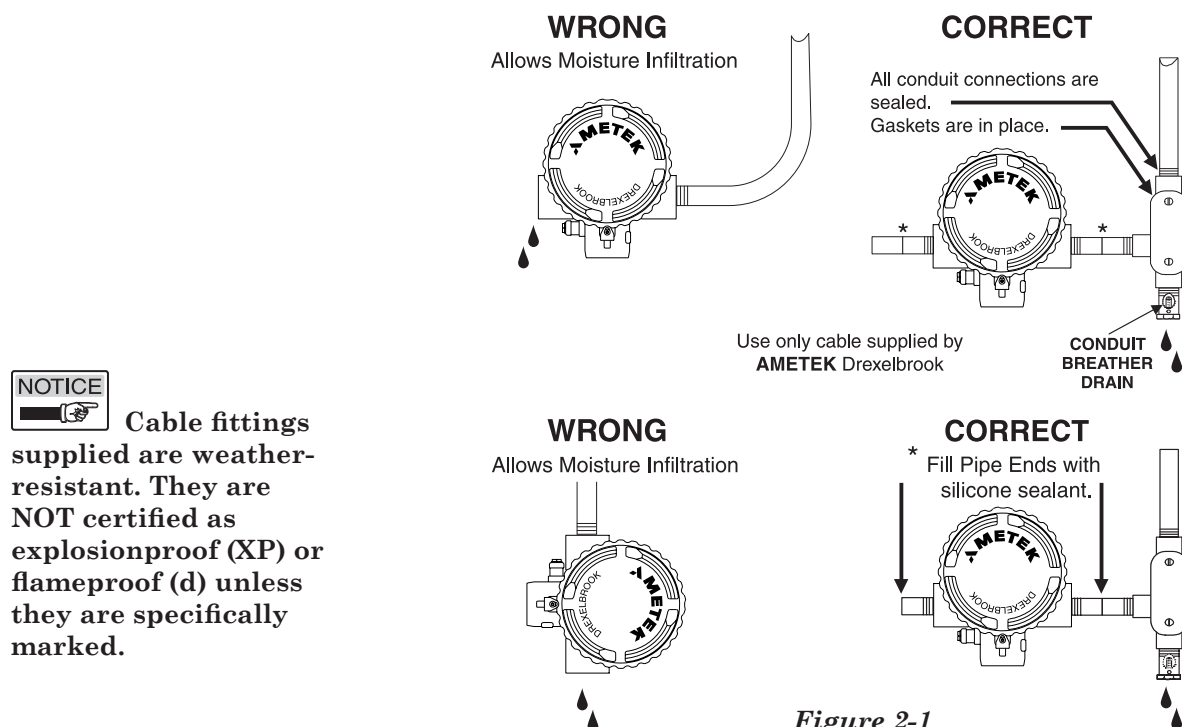


Figure 2-1
Recommended Conduit Connection

2.2 Mounting and Installation Guidelines (continued)



WARNING:

IntelliPoint RF equipment is rated explosion-proof.

When installing in areas where explosion is a concern [rated “potentially hazardous” (EU) or “hazardous classified” (USA)] observe all national and local regulations as well as specifications in the certificate.

Mount the sensing element using the installation guidelines in **Figure 2-2**.

When installing IntelliPoint RF instrument, ambient temperature at electronics must not exceed 70°C (158°F).

When installing flange-mounted sensing elements, keep mating surfaces and bolts free of paint and corrosion to ensure proper electrical contact with vessel. Avoid using excessive amounts of TFE tape when installing threaded sensing elements.



Install systems with threaded NPT connection via wrench flats on the process connection **ONLY**.

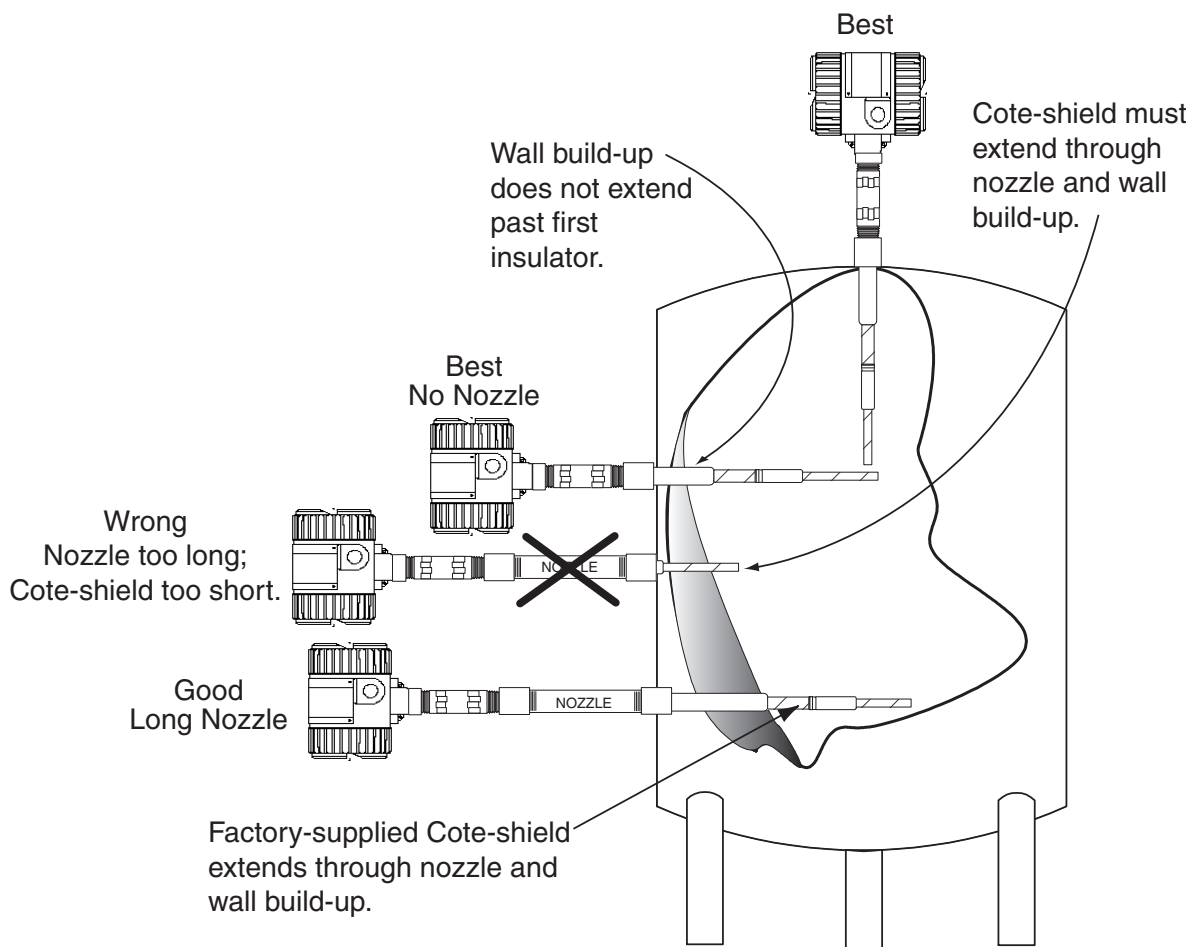


Figure 2-2
Installation Considerations

2.2 Mounting and Installation Guidelines (continued)

Mount the sensing element as to avoid enhancing electrostatic discharge from the process medium, as is good practice with any thermowell, displacer, or sampler. This includes correct bonding to the tank or silo wall.

If installation area is rated explosion-proof and requires conduit seal fittings, they should be used in accordance with company standards and local codes.

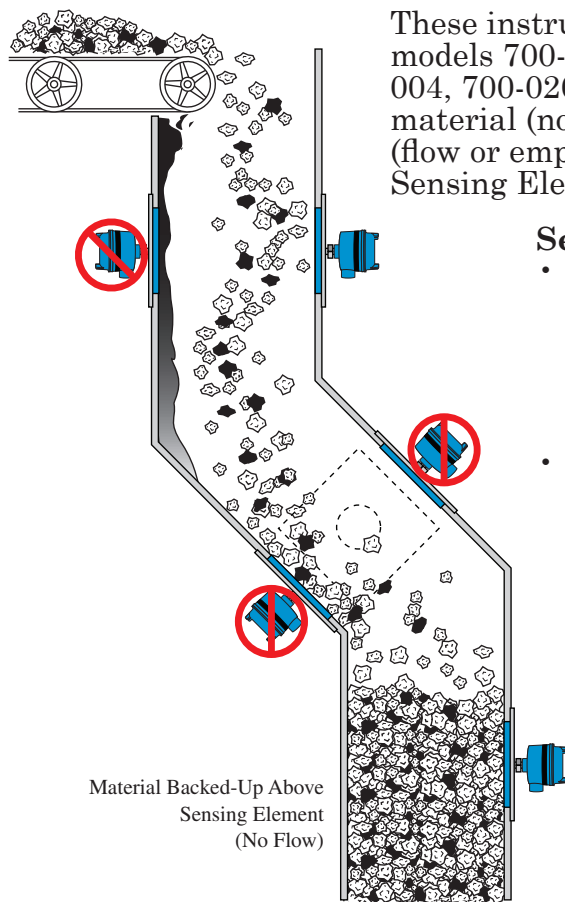
Mounting the sensing element inside a pipe is not recommended.

Do not mount a Cote-Shield sensing element through a nozzle that exceeds the length of first insulator.

Ensure there are no obstructions or agitator blades to interfere with sensing element.

Rigid sensing elements can be mounted either vertically or horizontally.

2.2.1 Installation of Flush-Mounted Sensing Elements



These instructions apply to all flush on/off sensing elements, models 700-0207-001, 700-0207-002, 700-0207-003, 700-0207-004, 700-0207-006. These systems will sense presence of material (no flow or plugged chute) and absence of material (flow or empty chute) at the sensing element. The Flush Sensing Element will ignore free falling material.

Sensing Element at the Top of a Chute.

- The flush sensing element should be mounted **In The Flow Stream**. These sensing elements are designed and built to withstand the impact of coal, rock, wood, chips, etc. This location is important to prevent excessive build up of material on the face of the sensing element.
- Excessive build up, typically consisting of wet and/or sticky fines, can occur if the sensing element is protected from falling material.

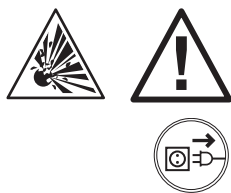
Sensing Element in an angle chute.

- Do not mount on the top or bottom.
- Best mounted on either side

Sensing Element at the Bottom

- Mount on any side.
- Low-Level sensors can be used to detect a plug or to insure that a seal is present (chute is full at this point).

2.3 Input Wiring

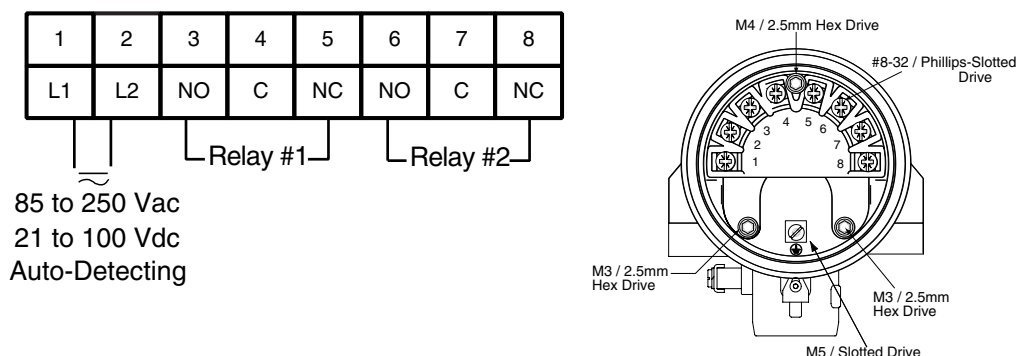


WARNING: If the IntelliPoint instrument is located in a hazardous environment, do not open the enclosure cover or make/break any electrical connections without first disconnecting electrical power at the source. Ensure the wiring, electrical fittings, and conduit connections conform to electrical codes for the specific location and hazard level.

The IntelliPoint RF instrument utilizes a universal power supply and can be operated from any source between 85 to 250 VAC or 21 to 100 VDC. The universal power supply automatically detects the input voltage regardless of polarity and does not require jumper changes.

To access, remove the housing lid on the customer connections side to reveal the input/output module (IOM). The IOM is an encapsulated assembly that contains the power supply, outputs, and eight wiring terminals. IOM is held in place with three screws. *See Figure 2-3.*

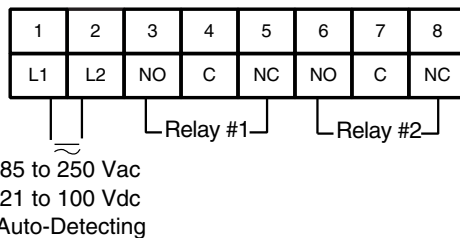
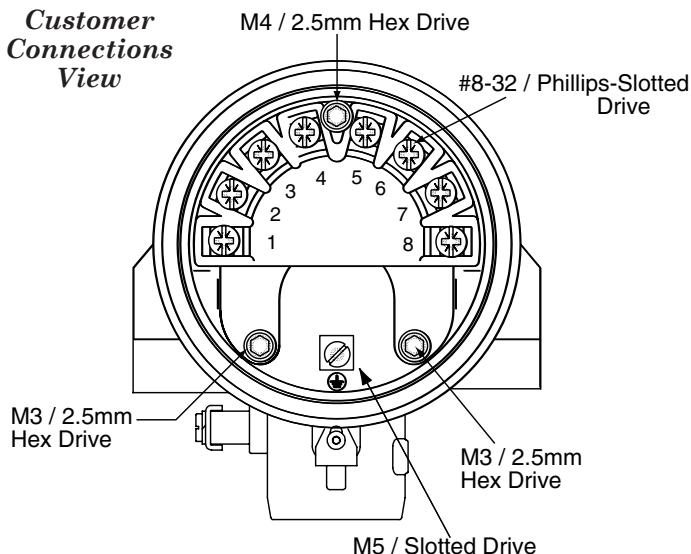
*Figure 2-3
Input Wiring*



2.4 Output Wiring - Relay Version

The IntelliPoint RF series instrument is supplied with two sets of contacts. These contacts can be used as a single 5A DPDT alarm relay:

*Customer
Connections
View*



One 5A DPDT Alarm

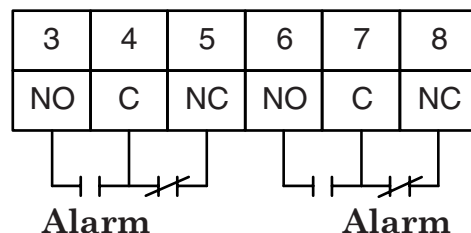


Figure 2-4 Relay Wiring

2.5 Spark Protection



Applications involving insulating granulars and insulating liquids may produce a static discharge that can damage the electronics. The RF series instrument is supplied with integral heavy-duty spark protection to prevent static discharges from damaging the electronic units.

2.6 Circuit Board

The circuit board is located on the sensing element/circuit side of the housing (marked on label). Remove the housing lid to access the status LEDs, time delay adjustment, and configuration jumpers. *See Figure 2-5.*

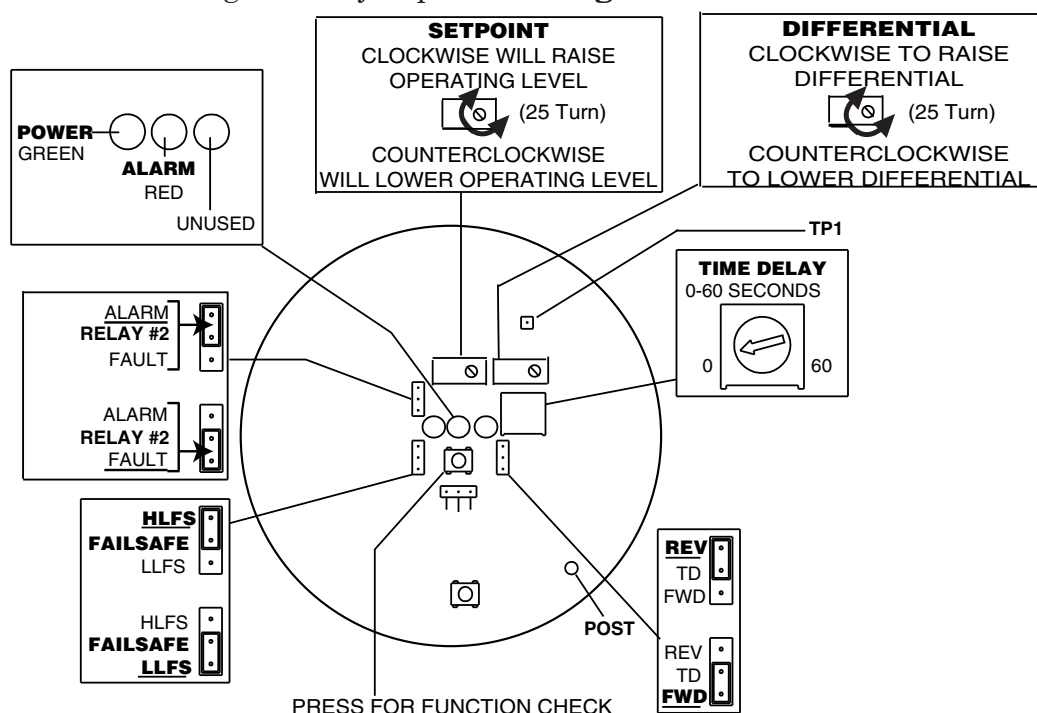


Figure 2-5 Circuit Board (Sensing Element Circuits View)

2.6.1 Time Delay

The TIME DELAY adjustment is located on the sensing element/circuit board side of the housing. It is used to help stop an oscillating relay output due to agitation or waves in the vessel. The time delay adjustment can be field-adjusted from 0 to 60 seconds. The unit is shipped with the TIME DELAY setting at zero (0) seconds.



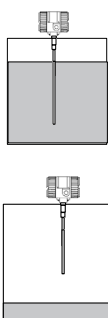
The Time Delay adjustment is a 270-Degree turn pot and is at zero seconds when in the full counter-clockwise position. **Do not force** the pot past the stop or damage will occur.

2.6.2 Time Delay Action

Time delay action describes whether the relay contacts are delayed from going into the alarm state or recovering from an alarm state.

- **FWD:** Delays system from coming out of alarm.
- **REV:** Delays system from going into alarm.
- Instrument is supplied with **TIME DELAY** action set in forward mode (**FWD**) position.
- Time delay action is field-selectable using jumper located on sensing element/circuit board side of housing.

2.6.3 Failsafe



Failsafe describes the level condition that causes the output relay to de-energize and also the state of the relay upon loss of power.

- **High Level Failsafe (HLFS)** is condition when probe is covered. Relay will de-energize when level is high, indicating high level upon loss of power. (N.O. contacts open and N.C. contacts closed).
- **Low Level Failsafe (LLFS)** is condition when probe is uncovered. Relay will de-energize when level is low, indicating low level upon loss of power. (N.O. contacts open and N.C. contacts closed).
- Instrument is supplied with failsafe jumper set in high level (**HLFS**) position.
- Failsafe is field-selectable using a jumper located on sensing element/circuit board side of housing.

2.6.4 Relay #2 Assignment

RELAY #2 assignment refers to operation of **RELAY #2**, and configures relays as (1) SPDT alarm and (1) SPDT fault relay or (1) DPDT alarm relay. **RELAY #1** is always an alarm relay.

- Alarm: **RELAY #2** will follow **RELAY #1**, providing a DPDT alarm relay.
- Fault: **RELAY #2** is used to indicate a fault.
- Instrument is supplied with **RELAY #2** jumper set in alarm position.
- **RELAY #2** assignment is field-selectable using a jumper located on sensing element/circuit board side of housing.

2.6.5 Function Check

The **Function Check (High Level Fail Safe Only)** test feature performs a confidence test of the system by duplicating the same signal as a high-level alarm condition without requiring the system to be removed from the tank.

Simulating a high level with the **Function Check** feature:

- Checks the relay connections to other control devices.

The **Function Check** test is initiated with the press of the **Function Check** button located on the sensing element/

2.6.5 Function Check (Continued)

circuit side of the housing. After pressing the button, the green LED flashes for 5 seconds and the two red LEDs light. The relay contacts are moved to the alarm condition for 2 seconds. If the two red LEDs do not light, and the relay contacts do not move to the alarm condition, the Manual Certify test has detected a fault. Consult the troubleshooting section of this Instruction Manual.

2.6.6 Setpoint and Differential Controls

See Calibration Section 3.0.

2.7 Output and LED Status

There are three status LEDs located on the sensing element/circuit board side of the housing. One is used to indicate that the unit has power. The remaining two LEDs are used to indicate the condition of relay #1 and relay #2. *See Figure 2-6.*

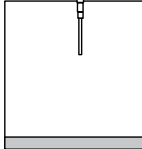



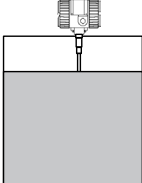



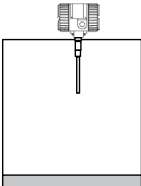



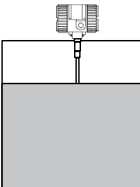



Tank Condition	Relay and LED Output Status												
 High Level FailSafe Tank Empty	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> <div><div>Power GREEN  LED On</div><div>Relay 1 RED  LED Off</div><div>Relay 2 RED  LED Off</div></div>	3	4	5	6	7	8	NO	C	NC	NO	C	NC
3	4	5	6	7	8								
NO	C	NC	NO	C	NC								
 High Level FailSafe Tank Full	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> <div><div>Power GREEN  LED On</div><div>Relay 1 RED  LED On</div><div>Relay 2 RED  LED On</div></div>	3	4	5	6	7	8	NO	C	NC	NO	C	NC
3	4	5	6	7	8								
NO	C	NC	NO	C	NC								
 Low Level FailSafe Tank Empty	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> <div><div>Power GREEN  LED On</div><div>Relay 1 RED  LED On</div><div>Relay 2 RED  LED On</div></div>	3	4	5	6	7	8	NO	C	NC	NO	C	NC
3	4	5	6	7	8								
NO	C	NC	NO	C	NC								
 Low Level FailSafe Tank Full	<table><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>NO</td><td>C</td><td>NC</td><td>NO</td><td>C</td><td>NC</td></tr></table> <div><div>Power GREEN  LED On</div><div>Relay 1 RED  LED Off</div><div>Relay 2 RED  LED Off</div></div>	3	4	5	6	7	8	NO	C	NC	NO	C	NC
3	4	5	6	7	8								
NO	C	NC	NO	C	NC								

Figure 2-6
Output and LED Status

2.8 Sensing Element Connection

Sensing element connects to the rear side of the circuit board and is factory-installed.



The sensing element is sealed to the housing and cannot be removed without permanent damage.

For IntelliPoint RF instruments that are mounted remotely from the sensing element, the cable connections from the sensing element to the electronic unit are made to the terminals on the sensing element side of the housing. See Figure 2-8. Connect Green (Ground) wire to green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.

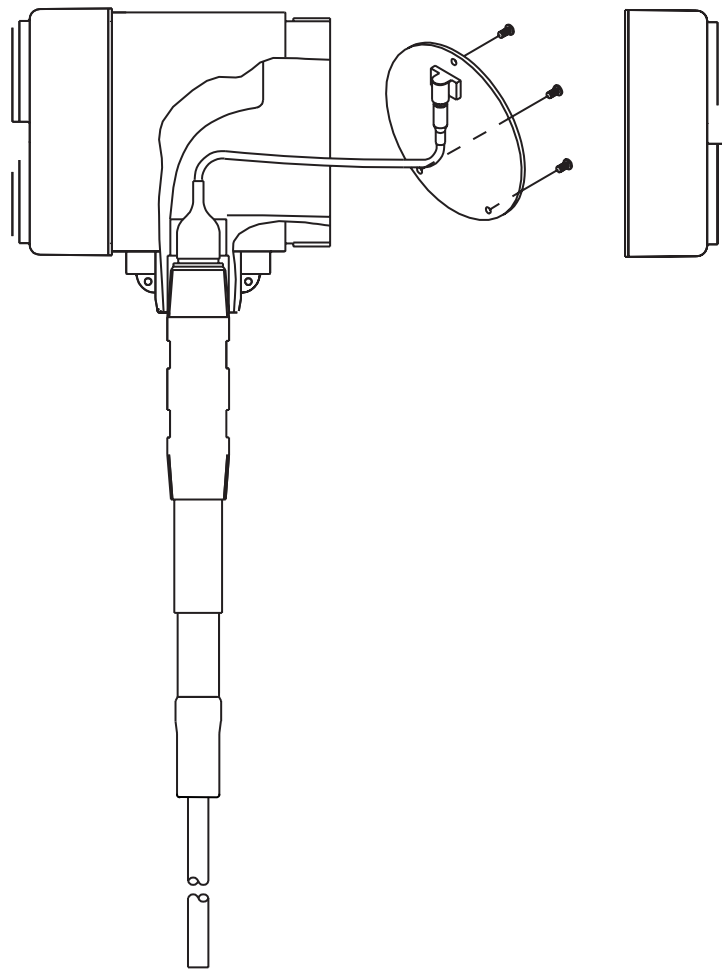


Figure 2-7
Sensing Element Connection
(Integral Housing)

2.8 Sensing Element Connection (continued)

For IntelliPoint RF instruments that are mounted remotely from the sensing element, the cable connections from the sensing element to the electronic unit are made to the terminals on the sensing element side of the housing. *See Figure 2-8.* Connect Green (Ground) wire to green screw, Red (Shield) wire to red screw, and Blue (Center) wire to blue screw.

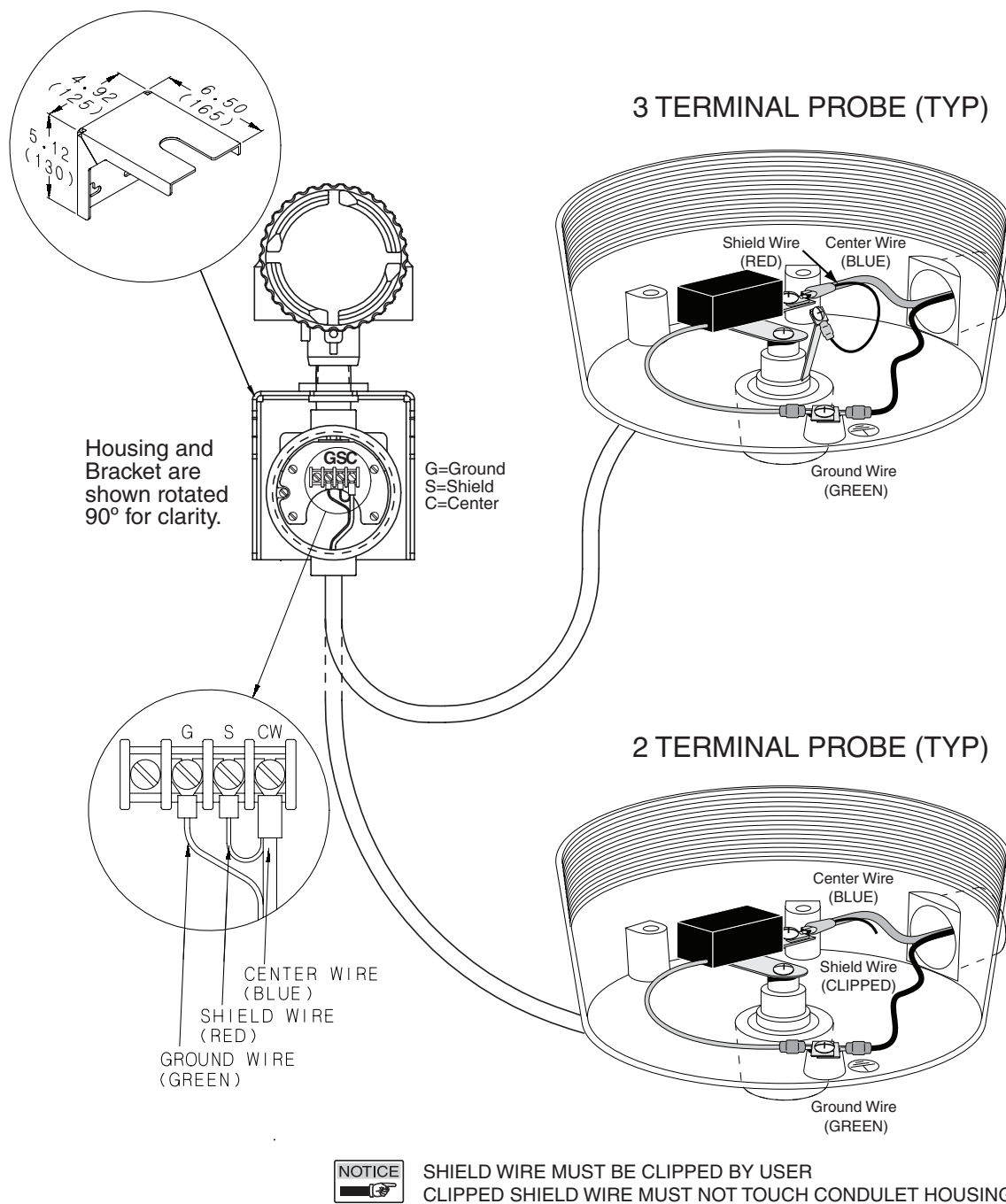


Figure 2-8
Sensing Element Connection
(Remote Housing)

Section 3

Section 3: Calibration



WARNING:

Before removing the explosion-proof housing cover in a potentially hazardous area, make certain that the area is safe. When calibration is complete, the cover must be replaced. Each conduit from the explosion-proof case must be equipped with an approved seal fitting.

3.1 Setpoint Control

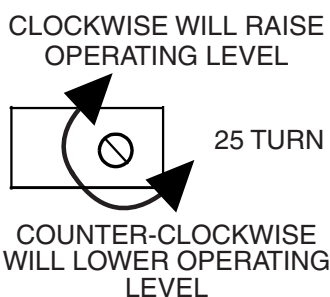


Figure 3-1
Set point Adjustment

There is a single adjustment located on top of the instrument that controls the point at which the relay operates. A red LED indicates that relay is de-energized.

Each revolution of the control changes the operating point approximately 4 pF. (For high-sensitivity models, each revolution will change operating point approximately 1 pF.)

Turning adjustment clockwise will raise level at which relay operates, turning it counterclockwise will lower level at which relay operates. Refer to **Figure 2-5** and *Section 3.3*.

3.2 Adjustable Differential Controls

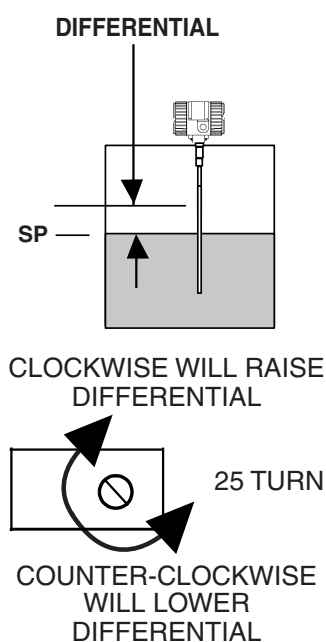


Figure 3-2
Differential Adjustment

Differential is the hysteresis (dead band), or change in level, necessary to switch electronic unit from one state to another. It is useful to prevent oscillation "chatter" on those occasions when level happens to be right at switching point or when surface is agitated.

RML Series level control with adjustable differential allows user to determine amount of capacitance change (hence level) between control point and recovery point. User can select two points on a vertical sensing element where relay contacts will open at one point and close at the other.

Range of operation is 3 to 100pF.

Low point range is that range of capacitance over which lower switching point may be adjusted.

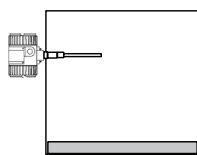
Differential range corresponds to differential in level on sensing element and depends on both the capacitance of the element itself and the properties of the material being measured. **See Figure 2-5** for location of adjustments. For calibration of adjustable differential units, see *Section 3.3.5*

3.3 Calibration Procedures



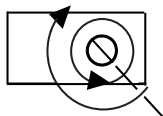
All RML Series controls with bare metal sensing elements are factory-set to switch in all water-based conducting materials. NO calibration adjustment is needed.

3.3.1 Quick Calibration

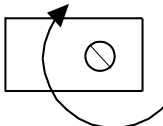


Quick Calibration method is **ONLY** recommended for horizontally mounted, bare metal, Cote-Shield sensing elements. In all cases it is necessary to have material level **below** the probe (sensing element in air).

Red LED OFF = relay energized = normal condition



**FROM FULL CCW COUNT,
CW UNTIL LED CHANGES**



CONTINUE per TABLE 3-1

1. For either High Level Fail Safe (HLFS) or Low Level Fail Safe (LLFS) begin with sensing element totally uncovered.
2. Starting with calibration adjustor in full counter clockwise (ccw) position, slowly turn clockwise (cw) until relay just operates. [Red LED will turn OFF in HLFS and turn ON in LLFS].
3. Note position of adjustor. Turn it clockwise (cw) from this point the additional number of turns indicated in **Quick Calibration Table 3-1**, below.

Calibration is Complete



1. Most water-based materials can be considered conductive, such as water, acids, bases, salt solutions, water-based slurries, and very wet granular materials. Carbon black and powdered metals conduct even without any water.

2. With conducting materials, if heavy build-up is anticipated, calibration adjustment can be turned to its clockwise limit.

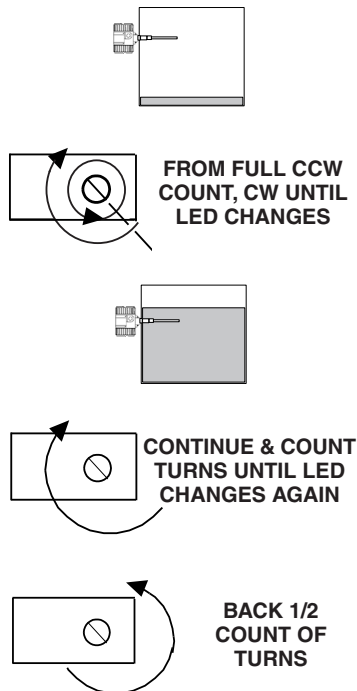
Table 3-1 Quick Calibration Chart

Material Being Measured	Number of Clockwise Adjustment Turns from Operate Position	
	RML Series (Standard Sensitivity)	RGL Series (High Sensitivity)
Conductive Materials - (Water-Based) - See Note 1	10 Turns (Note 2)	15 Turns (Note 2)
Insulating Liquids – Organics, Oil, Plastics	1/3 Turn (120°)	1 1/3 Turn
Granular above 50#/ft ³	1/3 Turn (120°)	1 1/3 Turn
Granular 30-60#/ft ³	1/4 Turn (90°)	1 Turn
Granular 25-50#/ft ³	1/6 Turn (60°)	2/3 Turn
Granular 20-40#/ft ³	1/8 Turn (45°)	1/2 Turn
Granular 10-20#/ft ³	High Sensitivity Recommended	1/6 Turn
Granular 5-15#/ft ³	High Sensitivity Recommended	1/8 Turn

3.3.2 Calibration of Horizontal Insulated Sensing Elements or Horizontal Sensing Elements in Insulating Materials



Red LED OFF = relay energized = normal condition



- A. Begin with sensing element totally uncovered.
- B. Starting with calibration adjustor in full counter clockwise (**ccw**) position, slowly turn clockwise (**cw**) until relay just operates. [Red LED will turn **OFF** in **HLFS**, and turn **ON** in **LLFS**].
- C. Note position of adjustor.
- D. Increase material level well above sensing element.
- E. Turn adjustor clockwise (**cw**) from this point, counting the additional number of turns until relay & LED, once again, changes state.
Note: Pot continues to spin even at the end of its adjustment (no mechanical stop).
- F. Turn adjustor back counterclockwise (**ccw**) half the number of turns that were counted in step E.
- G. Record that half number of turns as "PRELOAD" for use later in recalibration. *See Section 3.3.4.*

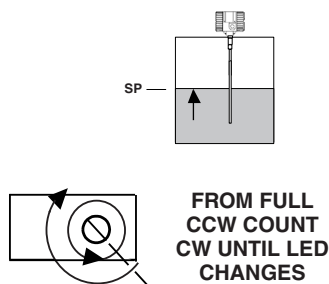
Calibration is Complete

If less than 1/4 turn of adjustment is observed between point where sensing element was uncovered and when covered, consult factory.

3.3.3 Calibration of Vertical Insulated Sensing Elements or Vertical Sensing Elements in Insulating Materials



Red LED OFF = relay energized = normal condition



- A. Set level to where control is desired. [Minimum of 3 inches should cover sensing element.]
- B. Starting from full counterclockwise (**ccw**) position, turn setpoint adjustor clockwise (**cw**), counting the turns until relay just operates [LED changes state].
- C. Record that number of turns as "PRELOAD" for use later in recalibration. *See Section 3.3.4.*

Calibration is Complete

3.3.4 Recalibration

If amount of preloading was recorded at time of initial calibration, it is possible to replace instrument without experimentally determining proper amount of preload.



- A. For recalibration using procedure in **Section 3.3.2**, follow Steps a, b, and c, then turn adjustor further clockwise (**cw**) amount of preload.
- B. For recalibration using procedure in **Section 3.3.3**, turn adjustor clockwise (**cw**), from full counter-clockwise (**ccw**) position, by amount of preload.
- C. When recalibrating for bare sensing elements in conductive materials (factory set), turn tuning adjustor to full clockwise (**cw**) position. No other adjustment is necessary. (Minimum of 25 turns.)

3.3.4 Recalibration (Continued)

Nonvolatile Memory

The IntelliPoint has nonvolatile memory which allows the unit to re-start after power outages without recalibrating.

When The IntelliPoint is powered for the first time the internal microprocessor records and stores the “Air” value.

This is the uncovered value of the sensor mounted in the vessel. The IntelliPoint will also store the last covered value and the last uncovered value.

Whenever The IntelliPoint is powered it uses these values as a reference point to determine its current condition (normal or alarm).

The IntelliPoint has nonvolatile memory which retains the recorded values even if power is lost for months. When The IntelliPoint regains power after a power outage, the microprocessor compares the stored values to the current measured value. It will then determine its current status based on this.

Example:

Air value is 10pF

covered value is 20pF

Uncovered value is 11pF

Setpoint = Alarm or recovery value.

For alarm this would typically be 2pF above the last uncovered value (13pF in this case). For recovery this would be halfway between the uncovered and covered value (15.5pF in this case). The setpoint is stored in memory to indicate the last status of the switch.

So, when the unit regains power the microprocessor reads the current value of the sensor and determines the status based on the stored values. It will only re-calibrate if the re-call button is pressed.

3.3.5 Calibration of Adjustable Differential Units (HLFS and LLFS)



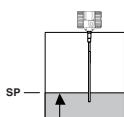
FULL CCW

- A. Put Fail-Safe switch in **HLFS** position.
See Section 2.6.3.

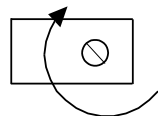


FULL CCW

- B. Turn Set Point adjustor to full counterclockwise (**ccw**) position.



- C. Turn Differential adjustor to full counterclockwise (**ccw**) position as well. *See Figure 2-5.*

UNTIL LED
CHANGES

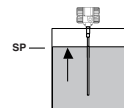
- D. Adjust material level to lower point of desired control band.

- E. Slowly turn Set Point adjustor clockwise (**cw**) until instrument just operates (LED changes state).

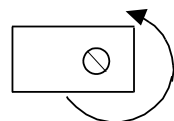


FULL CW

- F. Turn Differential adjustor to full clockwise (**cw**) position (maximum differential).



- G. Raise material level to upper point of desired control band.

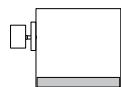
UNTIL LED
CHANGES

- H. Slowly turn the Differential adjustor counter-clockwise (**ccw**) until the LED changes state.

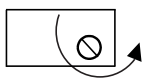
- I. Select desired Fail-Safe position.

Calibration is Complete

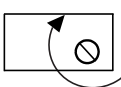
3.3.6 High Level Fail Safe Blind Calibration of Control w/Flush Sensing Element (Alarm when chute is full at sensor)



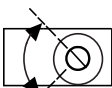
- A. Start with sensing element uncovered, (no material at sensing element), and tuning adjustment full counterclockwise (**ccw**). At this point red LED will be ON.

RED LED
OFF

- B. Turn adjustor clockwise (**cw**) until LED just turns OFF.

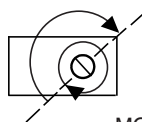
RED LED
ON

- C. Test unit by turning adjustor slowly counter-clockwise (**ccw**), then clockwise (**cw**) to determine differential of the electronics.

1/4 TURN MAX.
ON TO OFF

If ON/OFF differential of LED is more than one quarter turn, unit is not operating correctly. Please consult factory service department for assistance. This is a simple function test of the electronics.

DRY INSULATING
POWDERS

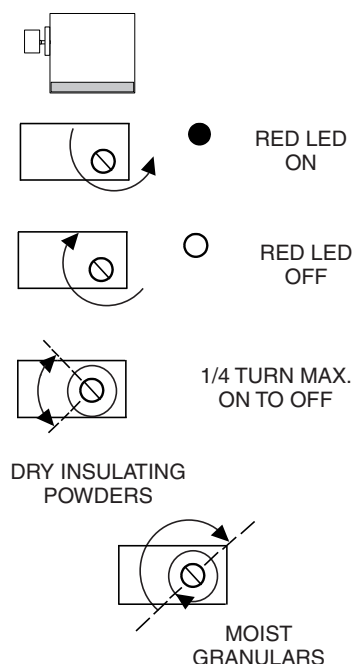
MOIST
GRANULARS

- D. If above operation is satisfactory, then continue turning adjustor clockwise (**cw**):

- One (1) turn for granulars containing moisture. (1 = 4PF)
- One half (1/2) turn for dry insulating powders.

Calibration is Complete

3.3.7 Low Level Fail Safe Blind Calibration of Control w/Flush Sensing Element (Alarm when chute is empty at sensor)



- Start with sensing element uncovered, (no material at sensing element), and tuning adjustor full counterclockwise (**ccw**). Red LED will be OFF.
- Turn adjustor clockwise (**cw**) until LED just turns ON.
- Test unit by turning adjustor slowly counter-clockwise (**ccw**), then clockwise (**cw**) to determine differential of the electronics.

If ON/OFF differential of LED is more than one quarter turn, unit is not operating correctly. Please consult factory service department for assistance. This is a simple function test of the electronics.

- If above operation is satisfactory, then continue turning adjustor clockwise (**cw**):
 - One (1) turn for granulars containing moisture. (1 = 4PF)
 - One half (1/2) turn for dry insulating powders.

Calibration is Complete



When excessive build-up on sensor occurs, turning adjustor clockwise will generally eliminate a false high-level signal. Build-up may continue to form, or, it may drop off. If the build-up drops off, the sensing element may cease to respond when material reaches it. This should be discussed with factory service. Call 1-800-527-6297.

Section 4: Spare Parts List

4.1 Spare Parts List

O-ring	250-1-75
Housing ¾-inch NPT Conduit Entry	260-2-540
Housing M20 Conduit Entry	260-2-542
Input/Output Module.....	385-48-6
Circuit Board.....	Contact Factory
Integral Sensing Element Cable	380-9000-97

Section 5

Section 5: Troubleshooting

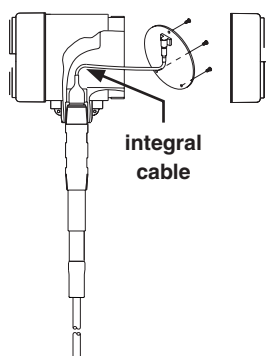


WARNING:

If IntelliPoint instrument is located in a hazardous environment, do not open enclosure cover or make/break any electrical connections without first disconnecting electrical power at the source. Ensure that wiring, electrical fittings, and conduit connections conform to electrical codes for the specific location and hazard level.

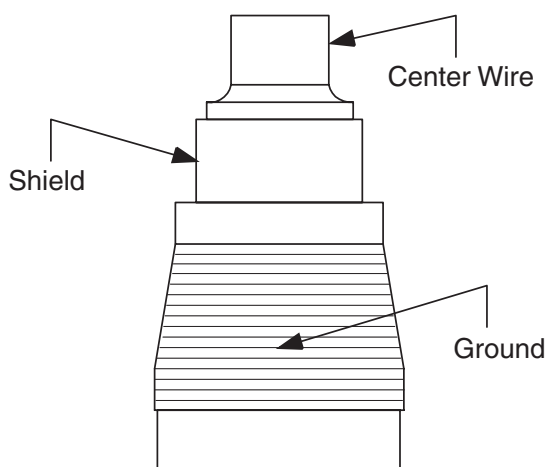
5.1 Testing Sensing Element

To test the sensing element, disconnect the integral cable. Refer to **Figure 5.1**.



Expect the following measurements:

Three Terminal Probes without Shield Tab



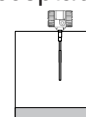
Measured Resistance (Sensor dry and clean):

Center Wire - Shield	∞ Ohms
Center Wire - Ground	∞ Ohms
Shield - Ground	∞ Ohms

Resistance readings must be taken using an analog ohmmeter set to Rx1000 scale.

When tank level is known to be below the sensor, minimum acceptable values are:

CW-G	1000 ohms.
CW-S	600 ohms.
S-G	300 ohms.



If the readings are less than the minimum acceptable values:

1. Check to see if tank is full, or if a severe coating is present.
2. Clean sensor and re-measure the sensor resistances.



Note: Low resistance readings are acceptable if the sensor is covered with a conductive liquid. Also, low resistance readings can be the result of material lodging in a long mounting nozzle. Refer to Figure 2-2.



Note: A reading of zero ohms usually indicates a metal-to-metal short circuit. Check for contact with tank wall, mounting nozzle, or other tank structure.

Figure 5.1
Testing Sensing Element

5.2 Testing Electronic Unit



This test is only a test of the electronic unit for troubleshooting purposes, and does not serve as a Verify or Certify test of the complete system.

Use the following steps to test the electronic unit:

1. Be sure the environment is safe before removing the lid from the housing.
2. If possible to access the sensing element with the material below the sensor, or remove the IntelliPoint from the vessel, use your finger to touch TP1 (Shown in Figure 2-4) while holding any bare metal portion of the instrument housing with the other hand. The system should go to its alarm state.
3. Again with no material touching the sensing element, touch the tip of the sensing element with your finger, while holding any bare metal portion of the instrument housing with the other hand. The system should go to its alarm state.
4. If the IntelliPoint changes to the alarm state while touching test point TP 1, but not when touching the tip of the sensor, in most cases, the interconnecting cable is faulty. See Section 5.6: Testing Integral Cable, or Section 5.7 Testing Remote Cable.
5. If IntelliPoint changes state while touching test point, but not when touching tip of sensor, in most cases, integral cable is faulty. Refer to **Section 5.6** Testing Integral Cable.
6. If IntelliPoint is stuck in one state:
 - a. Remove power.
 - b. Disconnect coax cable that joins sensing element to electronic unit.
 - c. Apply power.
 - d. Repeat steps 3 and 4.
 - e. If IntelliPoint changes state with sensing element disconnected, in most cases, sensing element is faulty. Refer to **Section 5.1** Testing Sensing Element.
7. If IntelliPoint fails all of the above tests, in most cases the instrument is faulty. Use a replacement Input/Output Module (IOM) or circuit board to determine fault. Consult factory.

5.3 Testing Relay Circuits

Use the following steps to check out the relay circuits:

- A. Relay circuits consist of single-pole double-throw relay contacts brought out to terminal strips for external switching. See **Figure 5-2**.
- B. Relay operation may generally be heard as an audible click when background noise is not too high. Connect ohmmeter to relay contacts to determine if they are switching.

5.3 Testing Relay Circuits (continued)

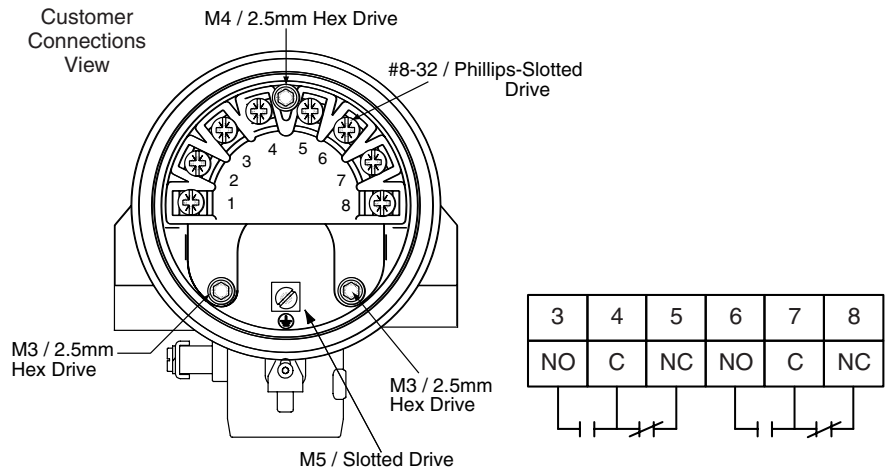


Figure 5.2
Relay Circuit Operation

5.4 Over Range

If relay #2 LED is flashing, instrument has detected that uncovered sensing element capacitance exceeds limits of transmitter. Consult factory for pad capacitor values and instructions.

5.5 Under Range

If relay #1 LED is flashing, instrument has detected that pad capacitor value is too large. Consult factory for pad capacitor values.

5.6 Testing Integral Cable

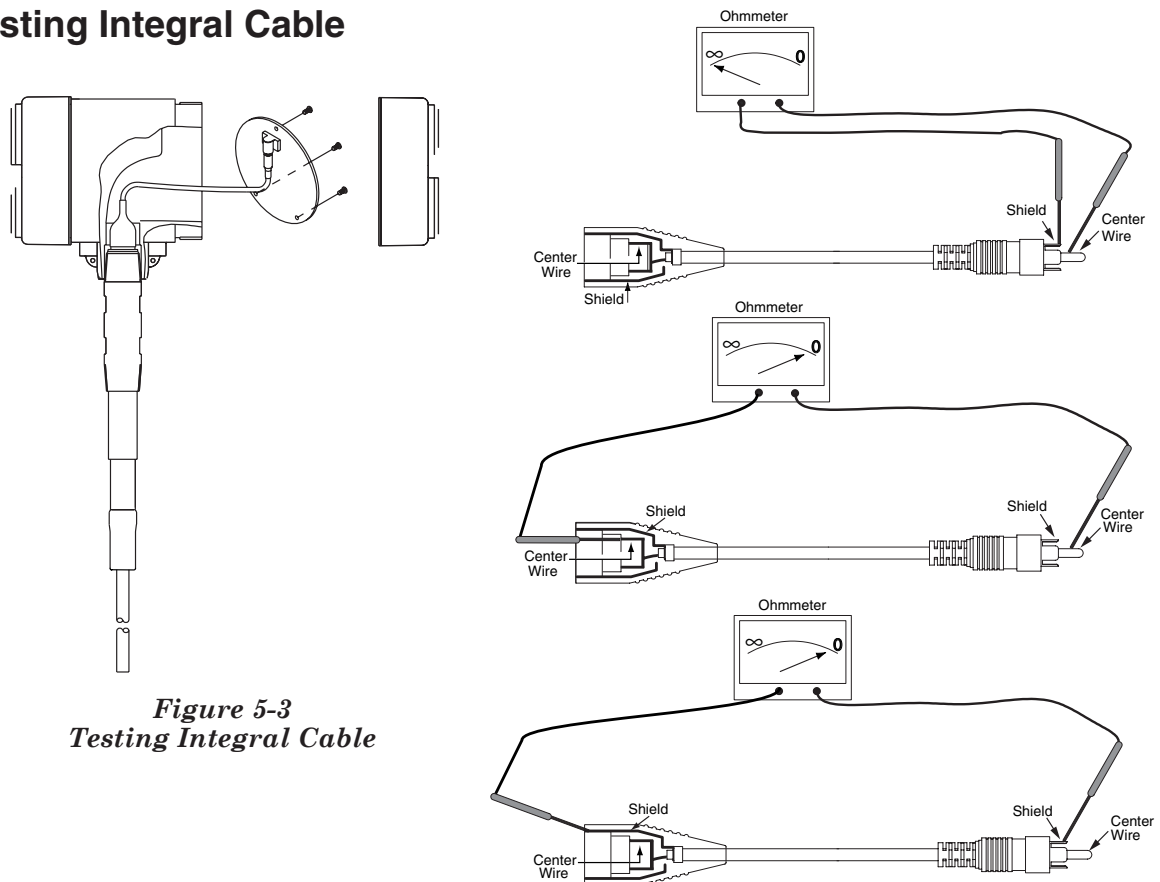


Figure 5-3
Testing Integral Cable

5.7 Testing Remote Cable

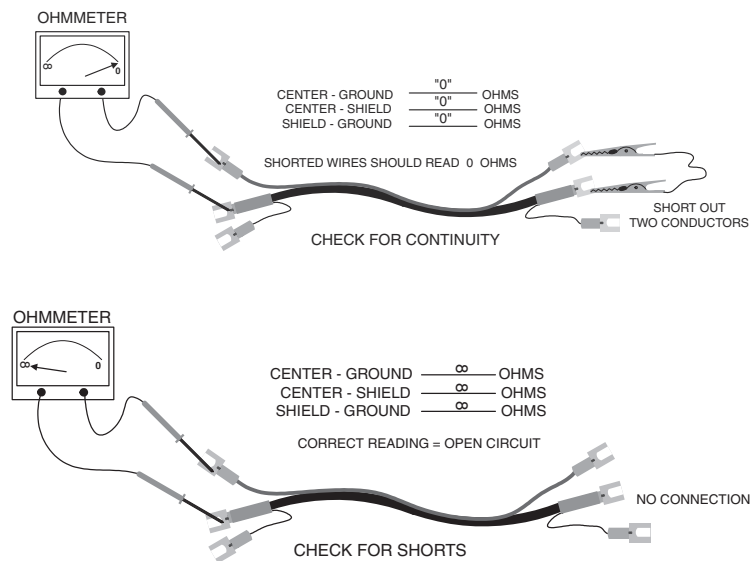


Figure 5-4
Testing Remote Cable

5.8 Testing Power Supply

Power supply can be tested separately as follows:



A. Remove power from electronic unit.

B. Remove three screws holding circuit board into housing.

C. Disconnect sensing element connection. Refer to **Figure 2-7 or 2-8**.

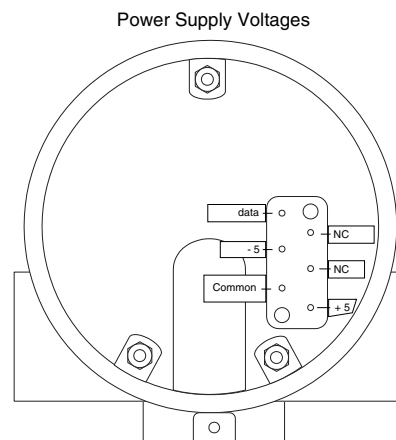


D. Reapply power.

E. Using a DC voltmeter, measure voltage from -5 to Common and +5 to Common. Correct readings are -5 to -6 and +5 to +6 Vdc. See **Figure 5-5**.

Figure 5-5
Testing Power Supply

VIEW INTO CUSTOMER CONNECTIONS SIDE



5.9 Factory Assistance

AMETEK Drexelbrook can answer any questions about your level measurement system. Call Customer Service at 1-800-553-9092 (US and Canada) , or +1-215-674-1234

If you require assistance and attempts to locate the problem have failed:

- **Contact** your local Drexelbrook representative
- **Call** the Service department toll-free:
1-800-527-6297 (US and Canada), or +1-215-674-1234
- **FAX** the Service department at +1-215-443-5117
- **E-Mail** to drexelbrook.service@ametek.com

Please provide the following information:

- Instrument Model Number
- Sensing Element Model Number and Length
- Original Purchase Order Number
- Material being measured
- Temperature
- Pressure
- Agitation
- Brief description of the problem
- Checkout procedures that have failed

5.10 Field Service

Trained field servicemen are available on a time-plus-expense basis to assist in start-ups, diagnosing difficult application problems, or in-plant training of personnel. Contact the service department for further details.

5.11 Customer Training

Periodically AMETEK Drexelbrook holds customer training seminars at the factory where the instruments are made. Guided by Drexelbrook engineers and specialists these sessions provide detailed information on all aspects of level measurement, from theory to the practice of instrument operation. For more information about these valuable workshops, write to AMETEK Drexelbrook, attention: Communications/ Training Group, or call direct +1-215-674-1234.

5.12 Equipment Return

In order to provide the best service, any equipment being returned for repair or credit must be pre-approved by the factory.

In many applications, sensing elements are exposed to hazardous materials.

- OSHA mandates that our employees be informed and protected from hazardous chemicals.
- Material Safety Data Sheets (MSDS) listing the hazardous materials to which the sensing element has been exposed MUST accompany any repair.
- It is your responsibility to fully disclose all chemicals and decontaminate the sensing element.

To obtain a Return Authorization Number (RA#), contact the Service department at 1-800-527-6297 (US and Canada) or +1-215-674-1234.

Please provide the following information:

- Model Number of Return Equipment
- Serial Number
- Original Purchase Order Number
- Process Materials to which equipment has been exposed.
- MSDS sheets for any hazardous materials
- Billing Address
- Shipping Address
- Purchase Order Number for Repairs

Please include a purchase order even if the repair is under warranty. If repair is covered under warranty, you will not be charged.

Ship equipment freight prepaid to:
AMETEK-DREXELBROOK.
205 KEITH VALLEY ROADzz
HORSHAM, PA 19044-1499

COD shipments will not be accepted.

Section 6: Specifications

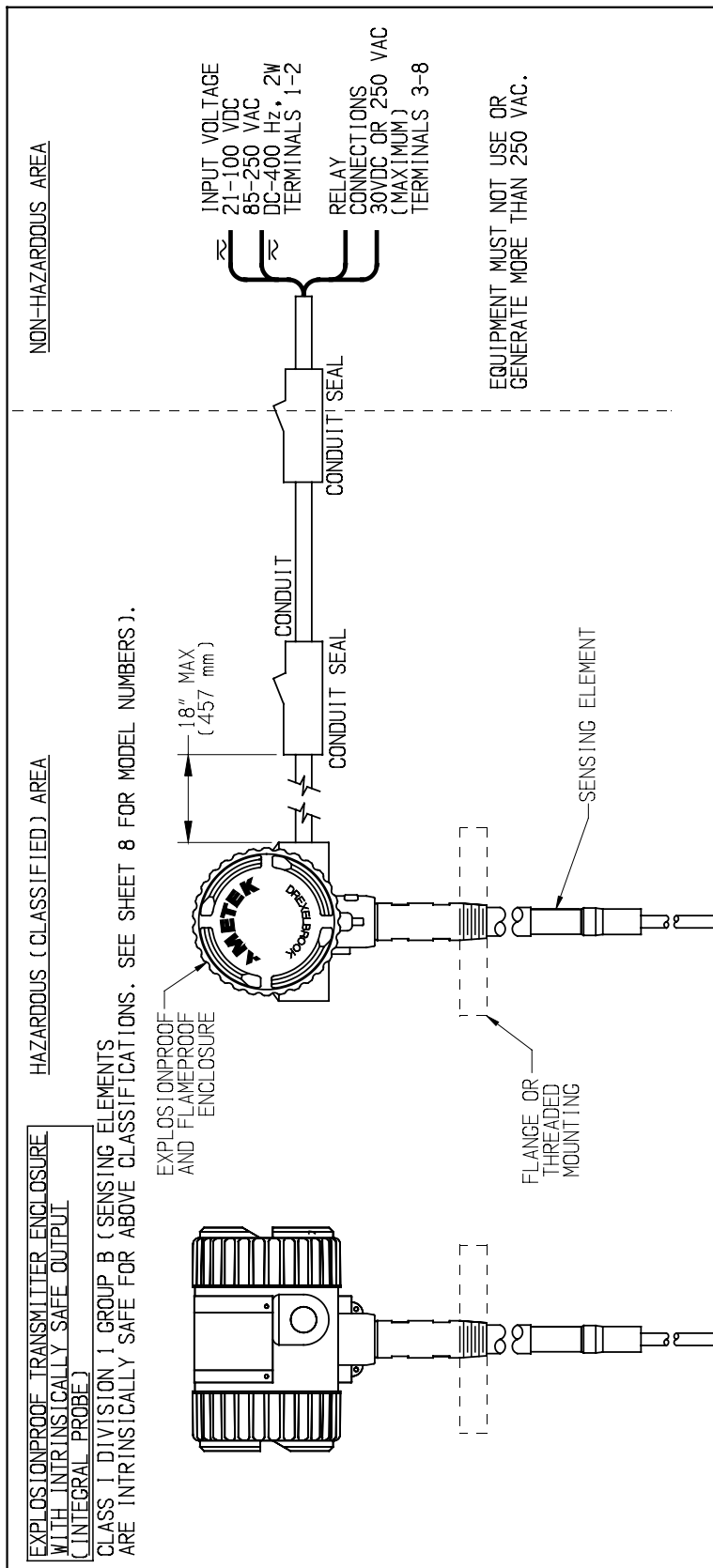
Technology:	RF/Capacitance
Calibration:	None
Modes of Operation:	High and Low level
Repeatability	2mm (0.08 inch) conductive liquids
Response Time:	Less than 1 second
Time Delay:	0 to 60 seconds forward and reverse acting.
Ambient Electronics:	-30 to 70°C (-28 to 158°F) ATEX. -40 to 70°C (-40 to 158°F) FM
Storage Temperature:	-40 to 85°C (-40 to 185°F)
Indicators:	LEDs: Green-Power, Red-Relay 1, Red-Relay 2
Power supply:	Universal Supply 85 to 250 VAC 21 to 100 VDC auto-detecting w/o jumper changes DC to 400 Hz
Power consumption:	2 Watts Maximum
Relay Contacts:	(2) SPDT
Maximum Contact Load:	5A/30 VDC, 5A/250 VAC - Environmentally Sealed
Maximum Switching Capacity:	2000 VA/150 Watt
Minimum Contact Load (DC):	100 mA/12 VDC 0 to 200 mA / 12 VDC Optional
Housing (Electronics):	Dual Compartment, powder-coated aluminum with two cable entries
Cable entry:	M20 x 1.5 ATEX ¾-inch NPT FM
Ingress Protection:	IP66 NEMA 4X
Approvals Available:	Explosion-proof for Class I, Division 1, Groups A, B, C, and D; Dust-Ignition proof for Class II, III, Division 1, Groups E, F, and G; Non-incendiary for Class I, Division 2, Groups A, B, C & D; Suitable for Class II, III, Groups F & G hazardous outdoor Type 4X, IP66 (classified) locations with Intrinsically Safe connections to Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G hazardous (classified) locations in accordance with Control Drawing 420-0004-144-CD.



Section 7

Section 7: Control Drawings

7.1 FM/FMc Control Drawings



MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 8

NOTES:

1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.

CERTIFIED	by		13	10-14-117	SGA	10-28-14	COPYRIGHT 2014
PO #			12	10-13-105	SGA	10-28-13	AMETEK DREXELBROOK
ENG			11	8-10-108	THP	1-13-11	SCALE NONE
USER			10	8-10-108	NOT RELEASED		UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)
			9	1-09-104	SGA	1-16-09	DR. JJS 10-28-14
#			ISS.	EDD/DSR NO.	APP'D	DATE	CK. LEP 10-28-14

METTEK®
DREXELBROOK

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

215-674-1234
FAX 215-674-273

FM/FM_c CONTROL DRAWING
FOR INTELLIPPOINT SERIES
CLASS I, DIVISION 1,
GROUP B (INTEGRAL)

420-0004-144-CD

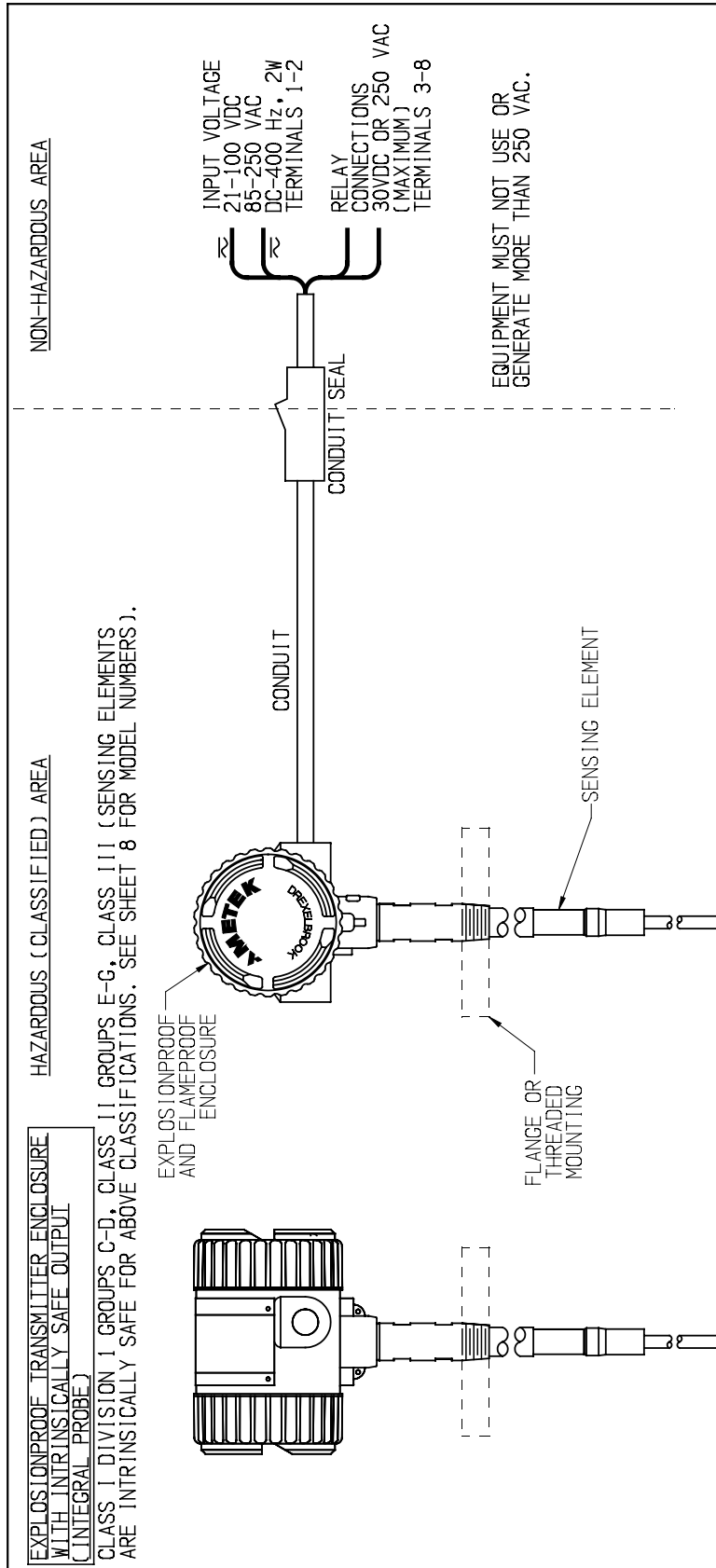
NO. 420-0004-144-CD

SHT 1 OF 10

7.1 FM/FMc Control Drawings (Continued)

NO. 420-0004-144-CD

SHT 2 OF 10



MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 8

NOTES:

1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED	by _____			
PO # _____	13	10-14-117	SGA	10-28-14
ENG _____	12	10-13-105	SGA	10-28-13
USER _____	11	8-10-108	THP	1-13-11
	10	8-10-108	NOT RELEASED	SCALE <u>NONE</u>
	9	1-09-104	SGA	1-16-09
	ISS.	EDD/ISR	NO. APP'D	DATE
				LEP 10-28-14
				CK.
				DR. JJS 10-28-14

AMETEK®

DREXELBROOK

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

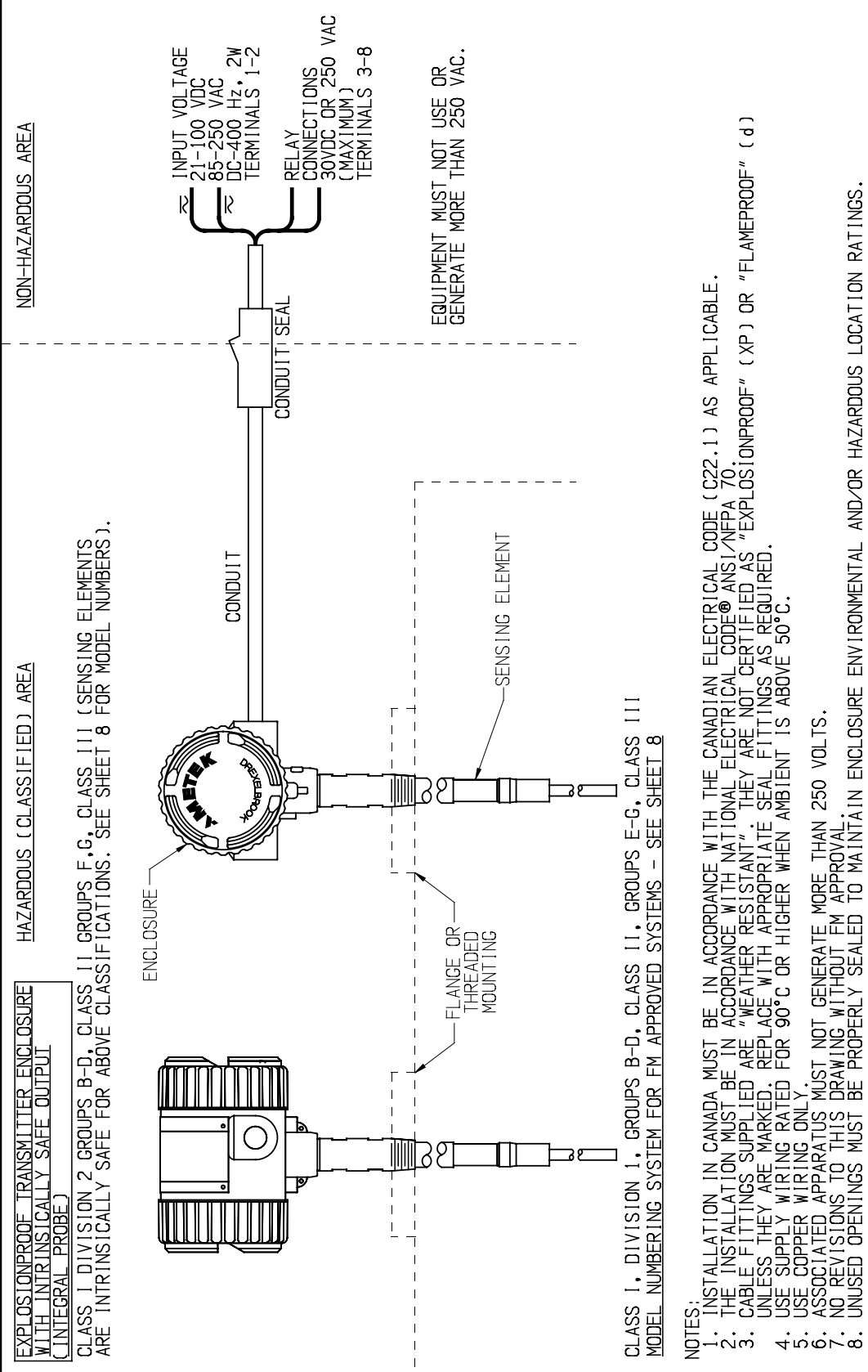
215-674-1234
FAX 215-674-2731

FM/FMc CONTROL DRAWING
FOR INTELLIPOINT SERIES
CLASS 1, II, III,
DIVISION 1,
GROUPS C-G (INTEGRAL)

SIT. 2 ISS.
420-0004-144-CD OF 10 13

7.1 FM/FMc Control Drawings (Continued)

NO. 420-0004-144-CD SHT 3 OF 10



EXPLOSIONPROOF TRANSMITTER ENCLOSURE WITH INTRINSICALLY SAFE OUTPUT (INTEGRAL PROBE)

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

CLASS I, DIVISION 2 GROUPS B-D, CLASS II, GROUPS F-G, CLASS III (SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS. SEE SHEET 8 FOR MODEL NUMBERS).

CLASS I, DIVISION 1, GROUPS B-D, CLASS II, GROUPS E-G, CLASS III
MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 8

- NOTES:
1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
 2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
 3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
 4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
 5. USE COPPER WIRING ONLY.
 6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
 7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
 8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED		by		13		10-14-117	SGA	10-28-14	COPYRIGHT 2014		AMETEK® DREXELBROOK		FM/FMc CONTROL DRAWING FOR INTELLIPOINT SERIES DIVISION 2 (INTEGRAL)		ISS		SHT. 3 OF 10		420-0004-144-CD	
PO #		12		10-13-105		SGA		10-28-13		AMETEK DREXELBROOK						215-674-1234 FAX 215-674-2731				
ENG		11		8-10-108		THP		1-13-11		SCALE NONE										
USER		10		8-10-108		NOT RELEASED				UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)										
		9		1-09-104		SGA		1-16-09		DR. JJS 10-28-14										
		ISS.		EDD/DSR		NO.		APP'D		DATE		CK.		SEP 10-28-14						
		DE #																		

7.1 FM/FMc Control Drawings (Continued)

EXPLOSIONPROOF TRANSMITTER ENCLOSURE
WITH INTRINSICALLY SAFE OUTPUT
(REMOTE PROBE)

CLASS 1 DIVISION 1 GROUP A (SENSING ELEMENTS
ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS.
SEE SHEET 9 FOR MODEL NUMBERS).

EXPLOSIONPROOF AND FLAMEPROOF
ENCLOSURE

HAZARDOUS (CLASSIFIED) AREA

NON-HAZARDOUS AREA

PROBE ENCLOSURE
285-0001-062
285-0001-063
285-0001-064
285-0001-065
285-0001-067

FITTINGS
(WEATHER
RESISTANT)

SENSING ELEMENT
CONNECTIONS
(INTRINSICALLY SAFE)

380 SERIES CABLE
150 FT. (46 METERS) MAX.
NOTE: INTRINSICALLY SAFE

SENSING ELEMENT

CONDUIT SEAL

CONDUIT

CONDUIT SEAL

INPUT VOLTAGE
21-100 VDC
85-250 VAC
DC-400 Hz, 2W
TERMINALS 1-2

RELAY
CONNECTIONS
30VDC OR 250 VAC
(MAXIMUM)
TERMINALS 3-8

EQUIPMENT MUST NOT USE OR
GENERATE MORE THAN 250 VAC.

MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 9

NOTES:
1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE® ANSI/NFPA 70.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT", THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "FLAMEPROOF" (d) UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
4. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
5. USE COPPER WIRING ONLY.
6. ASSOCIATED APPARATUS MUST NOT GENERATE MORE THAN 250 VOLTS.
7. NO REVISIONS TO THIS DRAWING WITHOUT FM APPROVAL.
8. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED by

PO #

ENG

USER

DE #

13 10-14-117 SGA 10-28-14 COPYRIGHT 2014

12 10-13-105 SGA 10-28-13 AMETEK DREXELBROOK

11 8-10-108 THP 1-13-11 SCALE NONE

10 8-10-108 NOT RELEASED UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)

9 1-09-104 SGA 1-16-09 DR. JJS 10-28-14

ISS EDO/DSR NO. APP'D DATE

CK. LEP 10-28-14

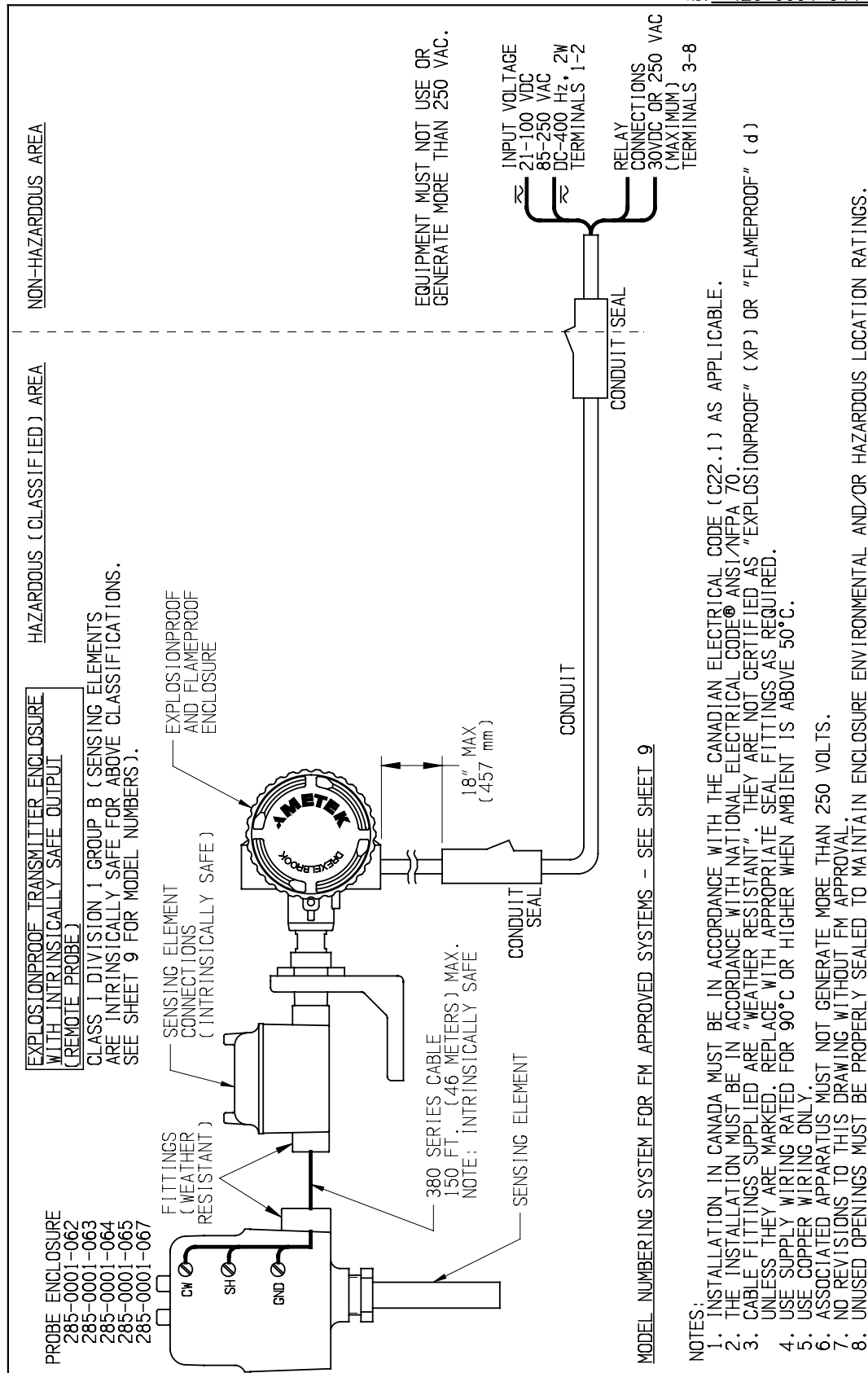
FM/FMc CONTROL DRAWING
FOR INTELLIPOINT SERIES
CLASS 1, DIVISION 1
GROUP A (REMOTE)

215-674-1234
FAX 215-674-2731

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

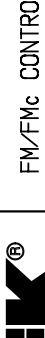
420-0004-144-CD SHT. 4 OF 10

7.1 FM/FMc Control Drawings (Continued)



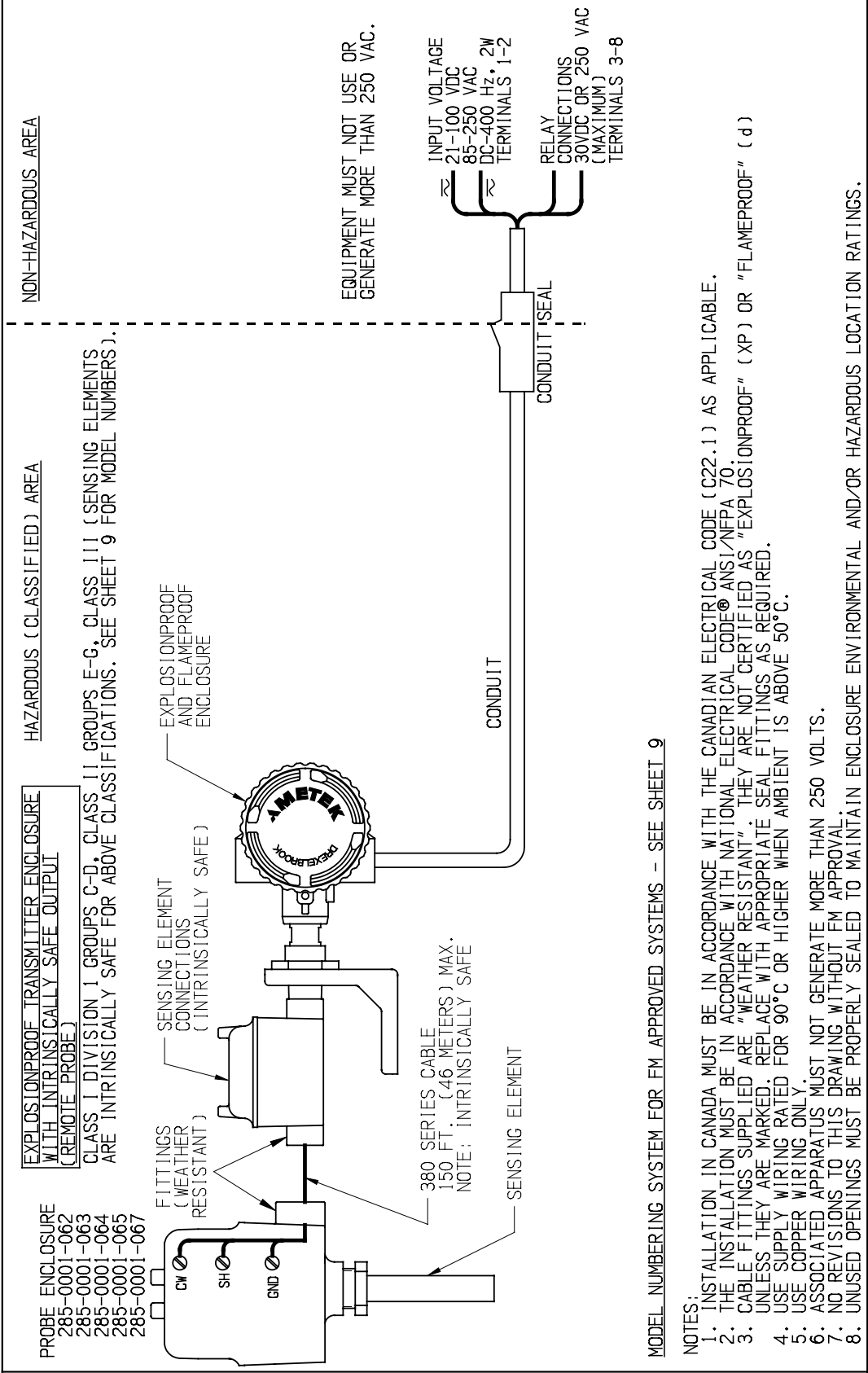
NOTES:

1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
2. THE INSTALLATION MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (NEC) AS APPLICABLE.
3. CABLE FITTINGS SUPPLIED ARE "WEATHER RESISTANT". THEY ARE NOT CERTIFIED AS "EXPLOSIONPROOF" (XP) OR "UNLESS THEY ARE MARKED. REPLACE WITH APPROPRIATE SEAL FITTINGS AS REQUIRED.
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CERTIFIED		by _____	
PO # _____	13	10-14-117	SGA
ENG _____	12	10-13-105	SGA
USER _____	11	8-10-108	THP
	10	8-10-108	NOT RELEASED
	9	1-09-104	SGA
	ISS. _____	EDD/DSR NO. _____	APP'D _____
		DATE _____	CK. _____
		DR. JJS 10-28-14	
		LEP 10-28-14	
		COPYRIGHT 2014	
		AMETEK DREXELBROOK	
		SCALE NONE	
		UNLESS OTHERWISE STATED	
		ALL DIMENSIONS IN INCHES (MM)	
			
205 KEITH VALLEY RD HORSHAM, PA 19044-9986 215-674-1234 FAX 215-674-2731			
FM/FMc CONTROL DRAWING FOR INTELLIPPOINT SERIES CLASS 1, DIVISION 1 GROUP B (REMOTE)			
DATE # _____ OF _____		420-0004-144-CD SHR. 5 OF 10	

7.1 FM/FMc Control Drawings (Continued)

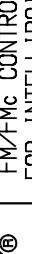
No. 420-0004-144-CD SHT 6 OF 10



MODEL NUMBERING SYSTEM FOR FM APPROVED SYSTEMS - SEE SHEET 9

NOTES:

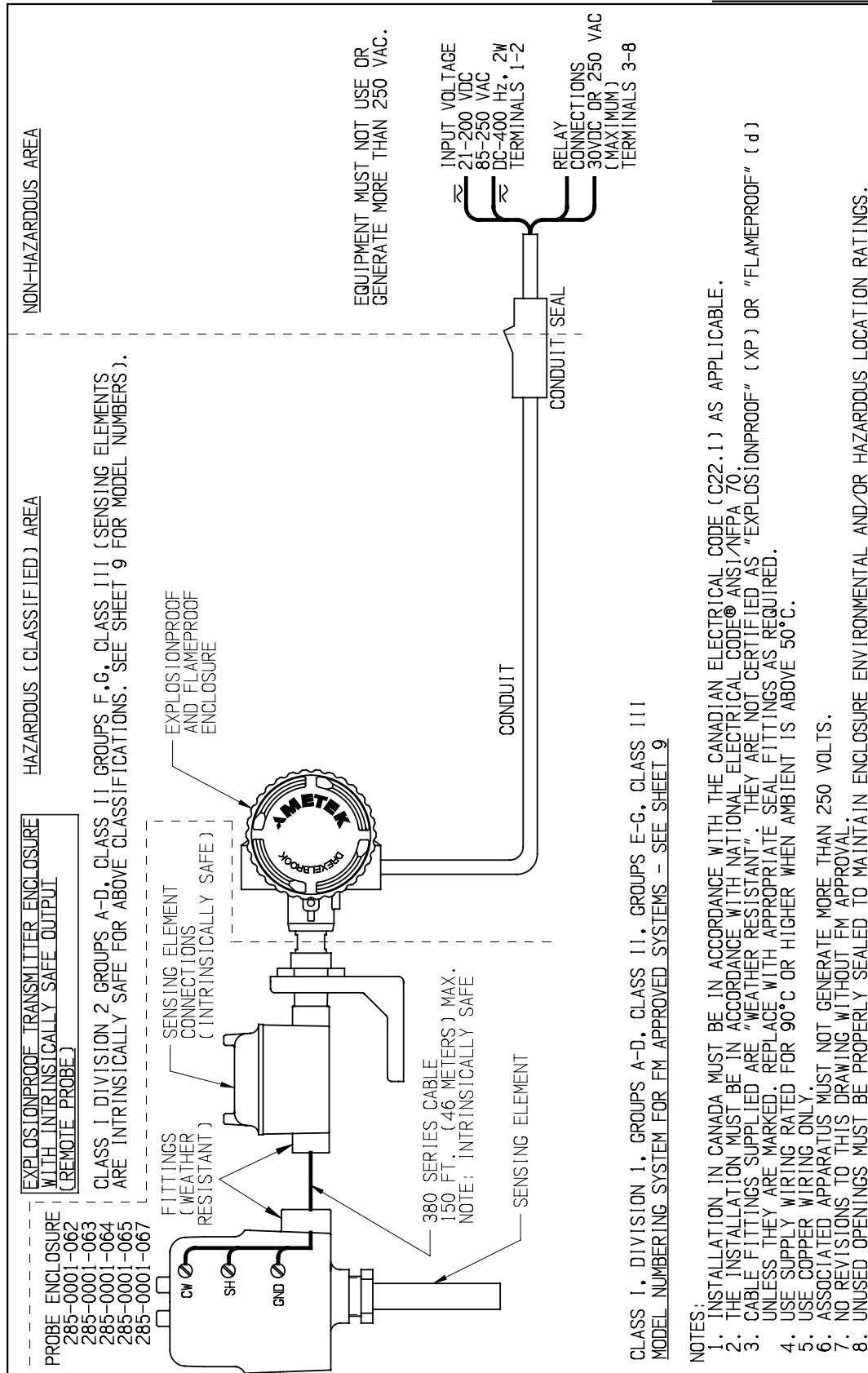
1. INSTALLATION IN CANADA MUST BE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (C22.1) AS APPLICABLE.
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CERTIFIED		by		13		10-14-117	SGA	10-28-14	COPYRIGHT		2014		<div> DREXELBROOK</div> <div>205 KEITH VALLEY RD HORSHAM, PA 19044-9986 215-674-1234 FAX 215-674-2731</div> <div>FM/FMc CONTROL DRAWING FOR INTELLIPOINT SERIES CLASS I, II, III, DIVISION 1 GROUP C-G (REMOTE)</div> <div>420-0004-144-CD</div> <div>SHT. 6 OF 10</div> <div>ISS. 6 OF 10</div>	
PO #		12		10-13-105		SGA	10-28-13	AMETEK DREXELBROOK						
ENG		11		8-10-108		THP	1-13-11	SCALE NONE						
USER		10		8-10-108		NOT RELEASED			UNLESS OTHERWISE STATED					
		9		1-09-104		SGA	1-16-09	DR. JUS 10-28-14						
								LEP 10-28-14						
								CK.						
DE #				ISS.		EDD/DSR		NO.		APP'D		DATE		


7.1 FM/FMc Control Drawings (Continued)

NO. 420-0004-144-CD

SHT 7 OF 10

[illegible]

7.1 FM/FMc Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY											
1	2	3	4	5	6	7	8	9	10	11	12
R	a	L	b	0	c	d	e	*	*	*	f
a								a = OPTIONS			
								N = NO-CAL (STD)			
								M = MANUAL SET POINT ADJUSTMENT			
								H = HI SENSITIVITY			
								G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT			
								L = STANDARD AUTO CAL			
								T = 10pF AUTO CAL			
								V = 10pF FIXED			
								P = HI SENSITIVITY .5pF FIXED			
b								b = OPTIONS			
								3 = (STD)			
								7 = DUAL SEAL			
								B = DUAL SEAL			
c								c = RELAYS			
								1 = STANDARD RELAY			
								2 = GOLD CONTACTS			
								d = 0, 1 OR Z SENSING ELEMENTS			
								e = 0-4, 6-9, Z SENSING ELEMENTS			
								SENSING ELEMENTS			
0 0								700-1202-021			
1								700-1202-022			
2								700-1202-024			
3								700-1202-028			
4								700-1202-042			
6								700-1202-032			
7								700-1202-020			
9								700-1202-034			
1 1								700-0201-005			
2								700-0201-005 HAST C			
3								700-0201-036			
6								700-0002-360			
7								700-0202-036			
8								700-0001-022			
9								700-0002-023			
N N								RETROFIT KIT 285-0001-671			
Z Z								SEE SHEET 10 FOR A LIST OF OTHER APPROVED SENSING ELEMENTS			
								f f = A-F, G, H, J, K, L OR Z			
								INSERTION LENGTH/COTE SHIELD LENGTH			
								A 6"/2" & 152.4mm/50.8mm			
								B 12"/2" & 304.8mm/50.8mm			
								C 12"/3.5" & 304.8mm/88.9mm			
								D 18"/2" & 457.2mm/50.8mm			
								E 18"/3.5" & 457.2mm/88.9mm			
								F 18"/10" & 457.2mm/254mm			
								G 18"/NO CSL & 457.2mm/NO CSL			
								H 36"/10" & 914.4mm/254mm			
								J 36"/NO CSL & 914.4mm/NO CSL			
								K 48"/10" & 1219.2mm/254mm			
								L 60"/10" & 1524mm/254mm			
								Z OTHER			
								1 18"/6" & 457.2mm/152.4mm			
								2 12"/6" & 304.8mm/152.4mm			
								<div style="float: right; text-align: right;"> COPYRIGHT 2014 AMETEK DREXELBROOK SCALE NONE <small>UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (MM)</small> DR. JJS 10-28-14 CK. LEP 10-28-14 </div>			
								CERTIFIED _____ by _____ PD # _____ ENG _____ USER _____ DE # _____			
13	10-14-117	SGA	10-28-14	<div style="text-align: center;">  </div> <div style="text-align: center; font-size: small;"> 205 KEITH VALLEY RD HORSHAM, PA 19044-9986 </div> <div style="text-align: center; font-size: small;"> 215-674-1234 FAX 215-674-2731 </div>							
12	10-13-105	SGA	10-28-13								
11	8-10-108	THP	1-13-11								
10	8-10-108	NOT RELEASED									
ISS.	EDQ/DSR NO.	APP'D	DATE	FM/FMc APPROVED INTEGRAL INTELLIPOINT MODEL NUMBERING SYSTEM <div style="float: right; text-align: right;"> 420-0004-144-CD SHT. 8 OF 10 ISS. 13 </div>							

7.1 FM/FMc Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY											
1	2	3	4	5	6	7	8	9	10	11	12
R	a	L	b	c	d	e	f	*	*	*	g
	a										a = OPTIONS
											N = NO-CAL (STD)
											L = STANDARD AUTO CAL
											M = MANUAL SET POINT ADJUSTMENT
											T = 10pf AUTO CAL
											H = HI SENSITIVITY
											V = 10pf FIXED
											G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT
											P = HI SENSITIVITY .5pf FIXED
	b										b = OPTIONS
											3 = (STD)
											7 = DUAL SEAL
											B = DUAL SEAL
	c										c = 1-9, A-K CABLE LENGTHS
	d										d = RELAYS
											1 = STANDARD RELAYS
											2 = GOLD CONTACTS
	e										e = 0-3, 5, 6, N, OR Z SENSING ELEMENTS
	f										f = 0-9, N, OR Z SENSING ELEMENTS
											SENSING ELEMENTS
	0	0									700-1202-001
		1									700-1202-012
		2									700-1202-014
		3									700-1202-018
		4									700-1202-041
		6									700-1202-031
		7									700-1202-010
		9									700-1202-033
	1	0									700-0001-018
		1									700-0201-005
		2									700-0201-005 HAST C
		3									700-0201-036
		4									700-0202-002
		5									700-0202-043
		6									700-0002-360
		7									700-0202-036
		8									700-0001-022
		9									700-0202-023
	2	0									700-0209-002
	3	1									700-0029-001
		2									700-0029-002
		3									700-0029-003
		4									700-0029-004
		5									700-0029-005
	5	0									700-0207-001
		1									700-0207-002
		2									700-0207-003
		3									700-0207-004
		4									700-0207-005
		5									700-0207-006
	6	0									700-0204-038
		1									700-0204-002
		2									700-0204-048
	N	N									RETROFIT KIT 285-0001-671
	Z	Z									SEE SHEET 10 FOR ADDITIONAL APPROVED SENSING ELEMENTS
											g g = A-F, G, H, J, K, L OR Z
											INSERTION LENGTH/COTE SHIELD LENGTH
											A 6"/2" & 152.4mm/50.8mm
											B 12"/2" & 304.8mm/50.8mm
											C 12"/3.5" & 304.8mm/88.9mm
											D 18"/2" & 457.2mm/50.8mm
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											J 36"/NO CSL & 914.4mm/NO CSL
											K 48"/10" & 1219.2mm/254mm
											L 60"/10" & 1524mm/254mm
											Z OTHER
											1 18"/6" & 457.2mm/152.4mm
											2 12"/6" & 304.8mm/152.4mm

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 AMETEK DREXELBROOK
 SCALE NONE
 UNLESS OTHERWISE STATED
 ALL DIMENSIONS IN INCHES (MM)
 DR. JJS 10-28-14
 CK. LEP 10-28-14

CERTIFIED by _____
 PO # _____
 ENG _____
 USER _____
 DE # _____

13	10-14-117	SGA	10-28-14
12	10-13-105	SGA	10-28-13
11	8-10-108	THP	1-13-11
10	8-10-108	NOT RELEASED	
ISS.	EDO/DSR NO.	APP' D	DATE

205 KEITH VALLEY RD. 215-674-1234
 HORSHAM, PA 19044-9986 FAX 215-674-2731

420-0004-144-CD
 SH. 9 OF 10
 ISS. 13

7.1 FM/FMc Control Drawings (Continued)

MODEL NUMBERS OF APPROVED SENSING ELEMENTS

701-mnop-qrst LEVEL PROBE

- l = FAMILY NO. 0, 4
 m = FAMILY NO. 0 THROUGH 9, BLANK
 n = FAMILY NO. 0 THROUGH 9, BLANK
 o = 0 THROUGH 9, BLANK
 p = 0 THROUGH 9
 q = FAMILY NO. 0 THROUGH 9, BLANK
 r = FAMILY NO. 0 THROUGH 9, BLANK
 s = FAMILY NO. 0 THROUGH 9
 t = 24 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

NOTES:

1. MAXIMUM PROCESS TEMPERATURE 290°C.
2. MAXIMUM SENSOR CAPACITANCE < 1 μ F.
3. MAXIMUM INSERTION LENGTH **RIGID SENSOR** 30 FEET (9.144 METERS).
4. MAXIMUM INSERTION LENGTH **FLEXIBLE SENSOR** 2000 FEET (609.6 METERS).
5. SENSING ELEMENT ENCLOSURE IP66 (IP RATING DOES NOT APPLY TO SPECIAL SENSORS SUPPLIED WITHOUT A 285- SERIES SENSING ELEMENT ENCLOSURE).

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 AMETEK DREXELBROOK
 SCALE NONE
 UNLESS OTHERWISE STATED
 ALL DIMENSIONS IN INCHES (MM)
 DR. JJS 10-28-14
 CK. LEP 10-28-14

CERTIFIED by _____
 PD # _____
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13	10-14-117	SGA	10-28-14
12	10-13-105	SGA	10-28-13
11	8-10-108	THP	1-13-11
10	8-10-108	NOT RELEASED	
ISS.	EDQ/DSR NO.	APP' D	DATE

AMETEK®
DREXELBROOK

205 KEITH VALLEY RD.
 HORSHAM, PA 19044-9986

215-674-1234
 FAX 215-674-2731

FM/FMc APPROVED
 ADDITIONAL
 SENSING ELEMENTS

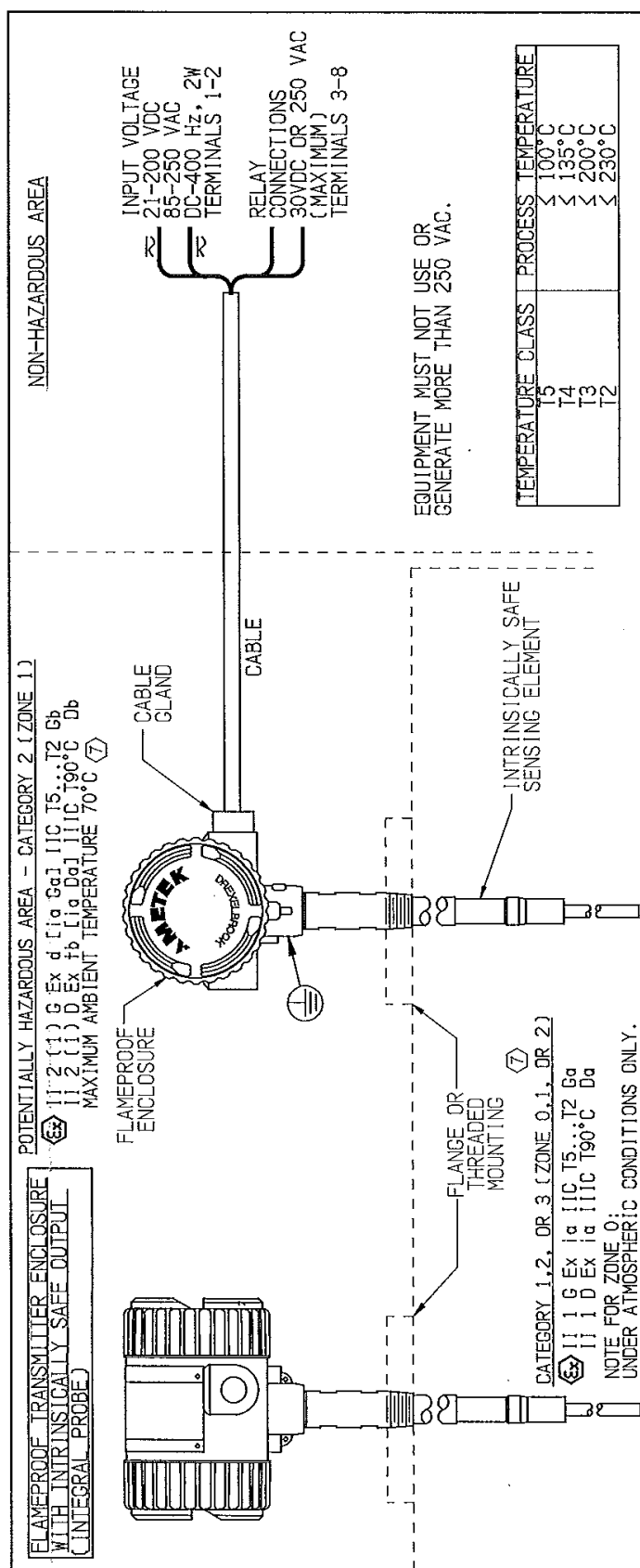
420-0004-144-CD

SHI. 10
 OF 10

ISS. 13

NO. 420-0004-144-CD
 SHI 10 OF 10

7.2 ATEX Control Drawings



(SENSING ELEMENTS ARE INTRINSICALLY SAFE FOR ABOVE CLASSIFICATIONS. SEE SHEET 3 FOR MODEL NUMBERS).

MODEL NUMBERING SYSTEM FOR ATEX APPROVED SYSTEMS - SEE SHEET 3.

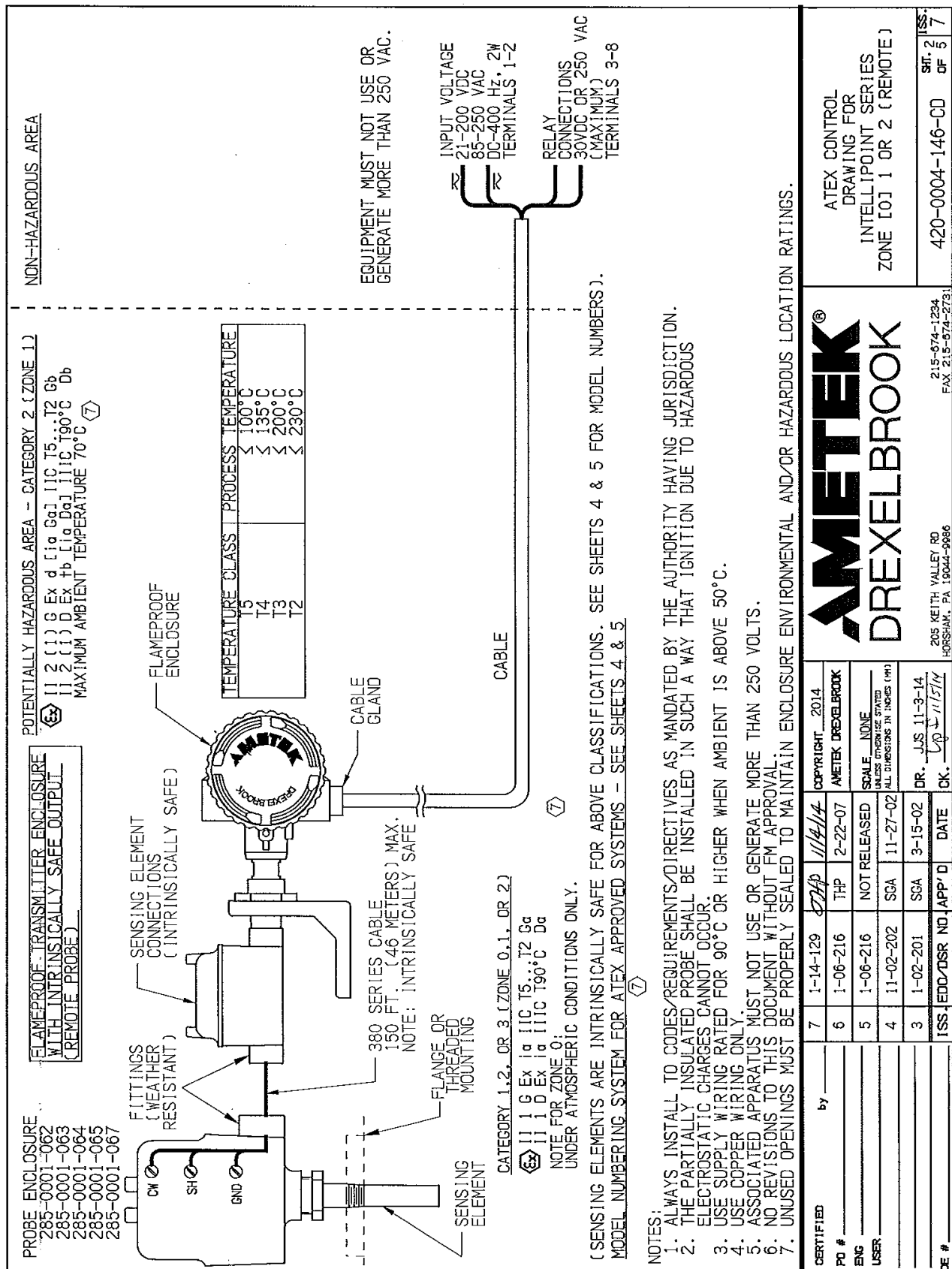
NOTES:

1. ALWAYS INSTALL TO CODES/REQUIREMENTS/DIRECTIVES AS MANDATED BY THE AUTHORITY HAVING JURISDICTION.
2. THE PARTIALLY INSULATED PROBE SHALL BE INSTALLED IN SUCH A WAY THAT IGNITION DUE TO HAZARDOUS ELECTROSTATIC CHARGES CANNOT OCCUR.
3. USE SUPPLY WIRING RATED FOR 90°C OR HIGHER WHEN AMBIENT IS ABOVE 50°C.
4. USE COPPER WIRING ONLY.
5. ASSOCIATED APPARATUS MUST NOT USE OR GENERATE MORE THAN 250 VOLTS.
6. NO REVISIONS TO THIS DOCUMENT WITHOUT FM APPROVAL.
7. UNUSED OPENINGS MUST BE PROPERLY SEALED TO MAINTAIN ENCLOSURE ENVIRONMENTAL AND/OR HAZARDOUS LOCATION RATINGS.

CERTIFIED		by		DATE		ISS	
PO #	7	1-14-129	11/14/14	COPYRIGHT 2014		ATEX CONTROL	
ENG	6	1-06-216	THP	2-22-07	AMETEK DREXELBROOK		DRAWING FOR
USER	5	1-06-216	NOT RELEASED	SCALE	NONE		INTELLIPOINT SERIES
	4	11-02-202	SSA	11-27-02	ALL DIMENSIONS IN INCHES (MM)		ZONE [0] 1 OR 2 (INTEGRAL)
	3	1-02-201	SSA	3-15-02	DR. JUS 11-3-14		
DE #					205 KEITH VALLEY RD HOBBSHAV, PA 19044-9986		
					215-674-1234 FAX 215-674-2731		
					420-0004-146-CD		SHT. 1 OF 5
							7

AMETEK®
DREXELBROOK


7.2 ATEX Control Drawings (Continued)



[illegible]

7.2 ATEX Control Drawings (Continued)

COLUMNS 9 AND UP DO NOT AFFECT SAFETY											
1	2	3	4	5	6	7	8	9	10	11	12
R	a	L	2	b	c	d	e	*	*	*	f
	a										
											a = OPTIONS
											N = NO-CAL (STD)
											M = MANUAL SET POINT ADJUSTMENT
											H = HI SENSITIVITY
											G = HI SENSITIVITY MANUAL SET POINT ADJUSTMENT
				b							b = RELAYS
											1 = STANDARD RELAY
											2 = GOLD CONTACTS
				c							c = 1-9, A-K - CABLE OPTIONS (REMOTE)
				d							d = 0-3, 5, 6, OR Z SENSING ELEMENTS
				e							e = 0-6, & 8, OR Z SENSING ELEMENTS
											SENSING ELEMENTS
				0	0						700-1202-001 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
				1							700-1202-012 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
				2							700-1202-014 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
				3							700-1202-018 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
				4							700-1202-041 FLAMEPROOF SENSING ELEMENT KEMA NO. Ex-00.E.2144 U
				1	0						700-0001-018 INTRINSICALLY SAFE SENSING ELEMENT
				1							700-0201-005 INTRINSICALLY SAFE SENSING ELEMENT
				2							700-0201-005 HAST C INTRINSICALLY SAFE SENSING ELEMENT
				3							700-0201-036 INTRINSICALLY SAFE SENSING ELEMENT
				4							700-0202-002 INTRINSICALLY SAFE SENSING ELEMENT
				5							700-0202-043 INTRINSICALLY SAFE SENSING ELEMENT
				6							700-0002-360 INTRINSICALLY SAFE SENSING ELEMENT
				8							700-0001-022 INTRINSICALLY SAFE SENSING ELEMENT
				2	0						700-0209-002 INTRINSICALLY SAFE SENSING ELEMENT
				3	1						700-0029-001 INTRINSICALLY SAFE SENSING ELEMENT
				2							700-0029-002 INTRINSICALLY SAFE SENSING ELEMENT
				3							700-0029-003 INTRINSICALLY SAFE SENSING ELEMENT
				5							700-0029-005 INTRINSICALLY SAFE SENSING ELEMENT
				5	0						700-0207-001 INTRINSICALLY SAFE SENSING ELEMENT
				1							700-0207-002 INTRINSICALLY SAFE SENSING ELEMENT
				2							700-0207-003 INTRINSICALLY SAFE SENSING ELEMENT
				3							700-0207-004 INTRINSICALLY SAFE SENSING ELEMENT
				4							700-0207-005 INTRINSICALLY SAFE SENSING ELEMENT
				5							700-0207-006 INTRINSICALLY SAFE SENSING ELEMENT
				6	0						700-0204-038 INTRINSICALLY SAFE SENSING ELEMENT
				Z	Z						SEE SHEET 4 FOR ADDITIONAL APPROVED INTRINSICALLY SAFE SENSING ELEMENTS
											f
											d = A-F, H, K, L OR Z
											INSERTION LENGTH/COTE SHIELD LENGTH
								A			6"/2" & 152.4mm/50.8mm
								B			12"/2" & 304.8mm/50.8mm
								C			12"/3.5" & 304.8mm/88.9mm
								D			18"/2" & 457.2mm/50.8mm
								E			18"/3.5" & 457.2mm/88.9mm
								F			18"/10" & 457.2mm/254mm
								H			36"/10" & 914.4mm/254mm
								K			48"/10" & 1219.2mm/254mm
								L			60"/10" & 1524mm/254mm
								Z			OTHER
								1			18"/6" & 457.2mm/152.4mm
								2			12"/6" & 304.8mm/152.4mm
7	1-14-129	THP	11/4/14								
6	1-06-216	THP	2-22-07								
5	1-06-216	NOT RELEASED									
4	11-02-202	SGA	1-27-02								
ISS.	EDO/DSR NO.	APP'D	DATE								



205 KEITH VALLEY RD
HORSNASH, PA 19044-9980

215-674-1234
FAX 215-674-2731

CERTIFIED by _____

PO # _____

ENG _____

USER _____

DE # _____

ATEX APPROVED INTELLIPOINT MODEL NUMBERING SYSTEM (REMOTE)

420-0004-146-CD

SHT. 4 OF 5

ISS. 7

7.2 ATEX Control Drawings (Continued)

MODEL NUMBERS OF APPROVED INTRINSICALLY SAFE SENSING ELEMENTS

700-mnop-grs-t LEVEL PROBE

- m = FAMILY NO. 0 THROUGH 9, BLANK
 n = FAMILY NO. 0 THROUGH 9, BLANK
 o = 0 THROUGH 9, BLANK
 p = 0 THROUGH 9
 q = FAMILY NO. 0 THROUGH 9, BLANK
 r = FAMILY NO. 0 THROUGH 9, BLANK
 s = FAMILY NO. 0 THROUGH 9
 t = 14 CHARACTER EXPANDED NUMBERING SYSTEM, DOES NOT AFFECT SAFETY

COPYRIGHT 2014
 AMETEK DREXELBROOK
 SCALE NONE
 UNLESS OTHERWISE STATED
 ALL DIMENSIONS IN INCHES (MM)
 DR. JJS 11-3-14
 CK. *g f u l r / 14*

CERTIFIED by _____
 PO # _____
 ENG _____
 USER _____
 DE # _____

7	1-14-129	<i>g f u l r / 14</i>	11/4/14
6	1-06-216	THP	2-22-07
5	1-06-216	NOT RELEASED	
4	11-02-202	SGA	1-27-02
ISS.	EDD/DSR NO.	APP'D	DATE

AMETEK®
DREXELBROOK

205 KEITH VALLEY RD
 HORSHAM, PA 19044-9986

215-674-1234
 FAX 215-674-2731

ATEX APPROVED
 ADDITIONAL INTRINSICALLY
 SAFE SENSING ELEMENTS
 (REMOTE)

420-0004-146-CD

SH. 5
 OF 5

ISS. 7

NO. 420-0004-146-CD

7.3 ATEX Approval Certificate

420-0004-497		Sht. of 1 4	APP'D BY SGA
ISSUE	EDO NO.	APP'D	DATE
1	2-15-113	Set	2.20.15



1 EC-TYPE EXAMINATION CERTIFICATE

- 2 Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 94/9/EC
- 3 EC-Type Examination Certificate No: FM14ATEX0049
- 4 Equipment or protective system:
(Type Reference and Name) R*L2-***, R*L2-0***, R*T2-0***, R*T2-00**, S*R*T2*0**, and S*R*T2-00** IntelliPoint RF Transmitter with Integral and Remote Sensor
- 5 Name of Applicant: AMETEK Drexelbrook
- 6 Address of Applicant: 205 Keith Valley Road, Horsham, PA 19044 USA
- 7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.
- 8 FM Approvals Ltd, notified body number 1725 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3051517 dated 8th January 2015
- 9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0+A11:2013, EN60079-1:2007, EN60079-11:2012, EN 60079-26:2007, EN 60079-31:2013, EN 60529+A2:2013
- 10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
- 11 This EC-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.



Mick Gower
certification manager, FM Approvals Ltd.
email: mick.gower@fmapprovals.com
en08
2015/01/23 15:59:21 Z

Mick Gower
Certification Manager, FM Approvals Ltd.

Issue date: 23rd January 2015

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS
T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: atex@fmapprovals.com www.fmapprovals.com

F ATEX 020 (Apr/14)

Page 1 of 4

7.3 ATEX Approval Certificate (Continued)

420-0004-497

Sht.
of 2
4ISSUE
1**SCHEDULE**

to EC-Type Examination Certificate No. FM14ATEX0049

- 12 The marking of the equipment or protective system shall include:

**IntelliPoint Transmitter with Remote Sensor**

II 2 (1) G Ex d [ia] IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 2 (1) D Ex tb [ia] IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**IntelliPoint Transmitter with Integral Sensor**

II 2 (1) G Ex d [ia] IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 2 (1) D Ex tb [ia] IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**IntelliPoint Two-Wire Transmitter with Remote Sensor**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**IntelliPoint Two-Wire Transmitter with Integral Sensor**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**SIL IntelliPoint Two-Wire Transmitter with Remote Sensor**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**SIL IntelliPoint Two-Wire Transmitter with Integral Sensor**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

**700-*, IntelliPoint Sensors**

II 1 G Ex ia IIC T5...T2 -30°C ≤ TAMB ≤ +70°C; IP66
 II 1 D Ex ia IIIC T90°C -30°C ≤ TAMB ≤ +70°C; IP66

- 13
- Description of Equipment or Protective System:**

The IntelliPoint RF Point Level System (RxLx) and IntelliPoint RF Two-Wire Point Level System (RxTx) consist of a transmitter, a 700 series level sensor and a 380 series connecting cable used for the remote version of the sensor. The system using the remote sensor may also include an RF filter. The transmitter provides intrinsically safe outputs to the sensing elements. It converts a capacitive level measurement into a relay contact signal. The 700 Series Sensors are passive devices having a capacitance of less than 1µF. The SIL version of the IntelliPoint RF Two-Wire Point Level System (SxTx) is identical in design to the RxTx.

Operation Temperature Ranges:

The ambient operating temperature range of the The IntelliPoint RF Point Level System (RxLx) and IntelliPoint RF Two-Wire Point Level System (RxTx) is -30°C to 70 °C. Process temperature range is -30°C to 230°C.

Electrical data:

The IntelliPoint RF Point Level System transmitter is powered by a maximum voltage of 250VAC and has a maximum power rating of 2.0W. The IntelliPoint RF Two-Wire Point Level System transmitter is powered by a maximum voltage of 30VDC and has a maximum power rating of 1.0W.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS

T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: atex@fmapprovals.com www.fmapprovals.com

F ATEX 020 (Apr/14)

Page 2 of 4

7.3 ATEX Approval Certificate (Continued)

420-0004-497	Sht. of	3 4	ISSUE 1
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SCHEDULE



to EC-Type Examination Certificate No. FM14ATEX0049

Model Options:

RaL2-bcde. IntelliPoint Transmitter with Remote Sensor.

a = Calibration: N, M, H, G, L, T, V, or P.

b = Cable Length: 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, or K.

c = Relays: 1 or 2.

d, e = Sensor, Sensor housing, Spark Protector Assembly: 00 through 04, 06, 07, 09 through 20, 31 through 35, 50 through 55, 60 through 62, or ZZ.

RaL2-0bcd. IntelliPoint Transmitter with Integral Sensor.

a = Calibration: N, M, H, G, L, T, V, or P.

b = Relays: 1 or 2.

c, d = Sensor, Cable: 00, 01, 02, or 03.

RaT2-b0cd. IntelliPoint Two-Wire Transmitter with Remote Sensor.

a = Calibration: N, M, H, G, L, T, V, or P.

b = Cable Length: 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, or K.

c, d = Sensor, Sensor housing, Spark Protector Assembly: 00 through 04, 06, 07, 09 through 20, 31 through 35, 50 through 55, 60 through 62, or ZZ.

Entity Parameters:

V_{max} = 30V, I_{max} = 140 mA, P_i = 1 W, C_i = 0, L_i = 145 µH

RaT2-00bc. IntelliPoint Two-Wire Transmitter with Integral Sensor.

a = Calibration: N, M, H, G, L, T, V, or P.

b, c = Sensor, Cable: 00, 01, 02, 03, 04, 06, 07, 09, 11, 12, 13, 16, 17, 18, 19, 25, 26, 27, 28, or ZZ.

Entity Parameters:

V_{max} = 30V, I_{max} = 140 mA, P_i = 1 W, C_i = 0, L_i = 145 µH

SaRbT2c0de. SIL IntelliPoint Two-Wire Transmitter with Remote Sensor.

a = SIL Level: Option not evaluated by FM Approvals.

b = Calibration: N, M, H, G, L, T, V, or P.

c = Cable Length 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, or K.

d, e = Sensor, Sensor housing, Spark Protector Assembly: 00 through 04, 06, 07, 09 through 20, 31 through 35, 50 through 55, 60 through 62, or ZZ.

Entity Parameters:

V_{max} = 30V, I_{max} = 140 mA, P_i = 1 W, C_i = 0, L_i = 145 µH

SaRbT2-00cd. SIL IntelliPoint Two-Wire Transmitter with Integral Sensor

a = SIL Level: Option not evaluated by FM Approvals.

b = Calibration N, M, H, G, L, T, V, or P.

c, d = Sensor, Cable: 00, 01, 02, 03, 04, 06, 07, 09, 11, 12, 13, 16, 17, 18, 19, 25, 26, 27, 28, or ZZ.

Entity Parameters:

V_{max} = 30V, I_{max} = 140 mA, P_i = 1 W, C_i = 0, L_i = 145 µH

700-a. IntelliPoint Sensors.

a = Any 7 digit numeric combination maintaining the limits of 420-0004-146-CD or 420-0004-175-CD.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS
T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: atex@fmapprovals.com www.fmapprovals.com

7.3 ATEX Approval Certificate (Continued)

420-0004-497	Sht. of	4 4	ISSUE 1
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SCHEDULE



to EC-Type Examination Certificate No. FM14ATEX0049

14 Specific Conditions of Use:

None

15 Essential Health and Safety Requirements:

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 Test and Assessment Procedure and Conditions:

This EC-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Ltd's ATEX Certification Scheme.

17 Schedule Drawings

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

18 Certificate History

Details of the supplements to this certificate are described below:

Date	Description
23 rd January 2015	Original Issue.

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS
T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: atex@fmaprovals.com www.fmaprovals.com

F ATEX 020 (Apr/14)

Page 4 of 4

7.4 CE Mark Declaration of Conformity



205 Keith Valley Road, Horsham, PA 19044
 Telephone: 215-674-1234 Fax: 215-674-2731
 www.ameetek.com www.drexelbrook.com



420-0004-176		Sht. 1 of 1	APP'D BY SGA
ISSUE	EDO NO.	APP'D	DATE
3	9-11-110	SGA	9-14-11
4	1-15-108	<i>SGA</i>	<i>1-30-15</i>

Declaration of Conformity

AMETEK DREXELBROOK
205 KEITH VALLEY ROAD
HORSHAM, PENNSYLVANIA
USA, 19044

We declare under our sole responsibility that the product **IntelliPoint Point Level Measurement Systems Model Number RXLX Series** which this declaration relates is in conformity with the following

standards and entitled to carry the CE Mark:

Product Type: Measurement, Control Equipment and Laboratory Use
Use following the provisions of the EMC Directive 2004-108-EC
Conforms to the requirements of:

Emissions requirements of:

EN61326-1:2006; Clause 7.2:

CISPR 11 Edition 4:2003 Radiated Emissions, Group 1, Class B

Immunity requirements of EN 61326-1:2006; Table 1

IEC 61000-4-2:2001 Electrostatic Discharge

IEC 61000-4-3:2002 Radiated Immunity

IEC 61000-4-4:2004 EFT/Burst. I/O leads

IEC 61000Q-4-5:2001 Surge Immunity, I/O leads

IEC 61000-4-6:2003 Conducted Immunity, I/O Leads

IEC 61000-4-8:1993, A1:2000 Power Frequency Magnetic Fields

Following the provisions of 94/9/EC ATEX Directives, Conforms to the requirements of:

EN 60079-0+A11:2013	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
EN 60079-1:2007	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
EN 60079-11:2012	Explosive atmospheres - Part 11: Equipment protection by Intrinsic safety "I"
EN 60079-26:2007	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga
EN 60079-31:2013	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
EN 60529+A2:2013	Degrees of protection provided by enclosures (IP Code)

EC-Type Examination Certificate Number FM14ATEX0049 Notified Body Number 1725

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK SL4 1RS

Steven G. Arnold

7.5 Mounting and Wiring for Spark Protector Drawings

NO. 377-0001-019

SHT 1 OF 2

TYPICAL INSTALLATION OF
SPARK PROTECTORS

FIGURE -A- : CONNECTION OF THREE CONDUCTOR
COTE SHIELD CABLE TO FLEXIBLE
2-TERMINAL ELEMENTS: 700-0005-XXX.

FIGURE -B- : CONNECTION OF THREE CONDUCTOR
COTE SHIELD CABLE TO RIGID
2-TERMINAL SENSING ELEMENTS
700-0001-XXX & 700-0002-XXX.

FIGURE -C- : CONNECTION OF THREE CONDUCTOR
COTE SHIELD CABLE TO RIGID
3-TERMINAL SENSING ELEMENTS:
700-0200-XXX & 700-0202-017.

FIGURE -D- : CONNECTION OF THREE CONDUCTOR
COTE SHIELD CABLE ON FLEXIBLE
3-TERMINAL SENSING ELEMENT
700-0205-XXX.

FOR HI. TEMP APPLICATIONS REFER
TO 377-0001-016-CD.

APPROVED DRAWING...
CHANGES TO THIS DRAWING
REQUIRE AGENCY APPROVAL
PER 440-0015-003
☐ FM ☐ CSA ☒ KEMA
☐ 440-0004-017

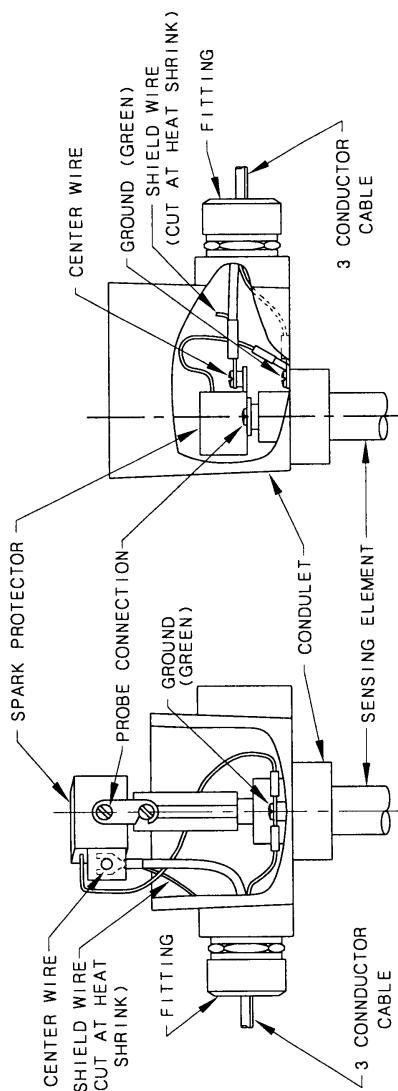


FIGURE -A-

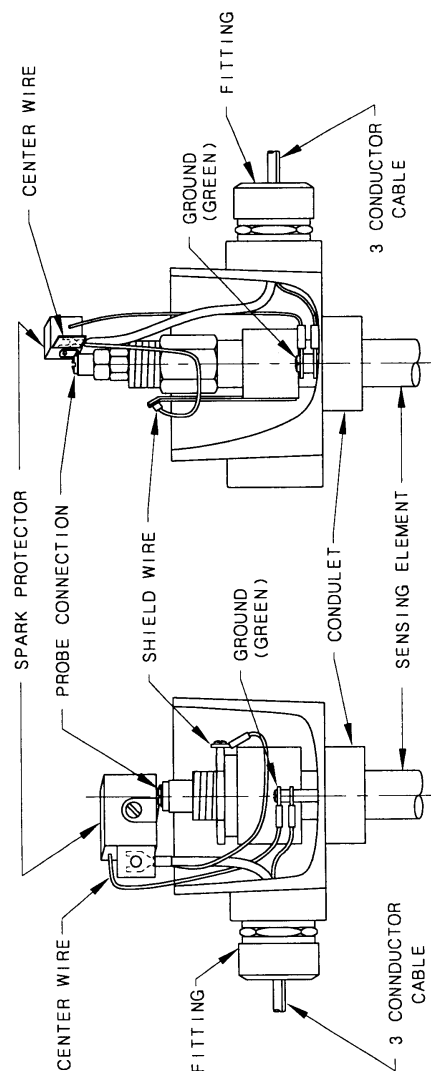


FIGURE -B-

FIGURE -C-

AMETEK®
DREXELBROOK

215-674-1234
FAX 215-674-2731

205 KEITH VALLEY RD
HORSHAM, PA 19044-9886

377-0001-019 HEAVY DUTY
SPARK PROTECTOR
CUSTOMER CONNECTION
MOUNTING & WIRING

377-0001-019-CD

SHT. 1 OF 2

ISS. 5

CERTIFIED	by	COPYRIGHT 2004	AMETEK DREXELBROOK
PO #	5	2-04-336	SCALE NONE
ENG	4	7-93-303	UNLESS OTHERWISE STATED
USER	3	8-92-83	ALL DIMENSIONS IN INCHES (MM)
ISS.	EDO/DSR	NO.	APP'D
DE #		DATE	
		DR.	CDW
		CK.	JJ 3-3-04

7.5 Mounting and Wiring for Spark Protector (Continued)

NO. 377-0001-019

SHT 2 OF 2

TYPICAL INSTALLATION OF SPARK PROTECTORS

FIGURE -E- : CONNECTION OF THREE CONDUCTOR
COTE SHIELD CABLE IN PARALLEL
WITH REMOTE VERIFY SWITCH.

FOR HI . TEMP APPLICATIONS REFER
TO 377-0001-016-CD.

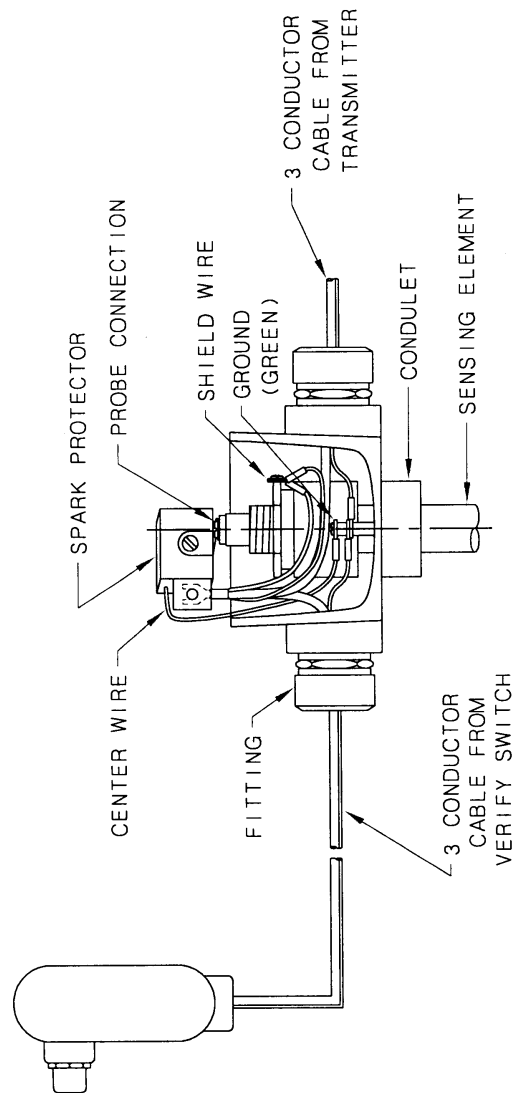


FIGURE -E-

METEK®
DREXELBROOK

215-674-1234
FAX 215-674-273

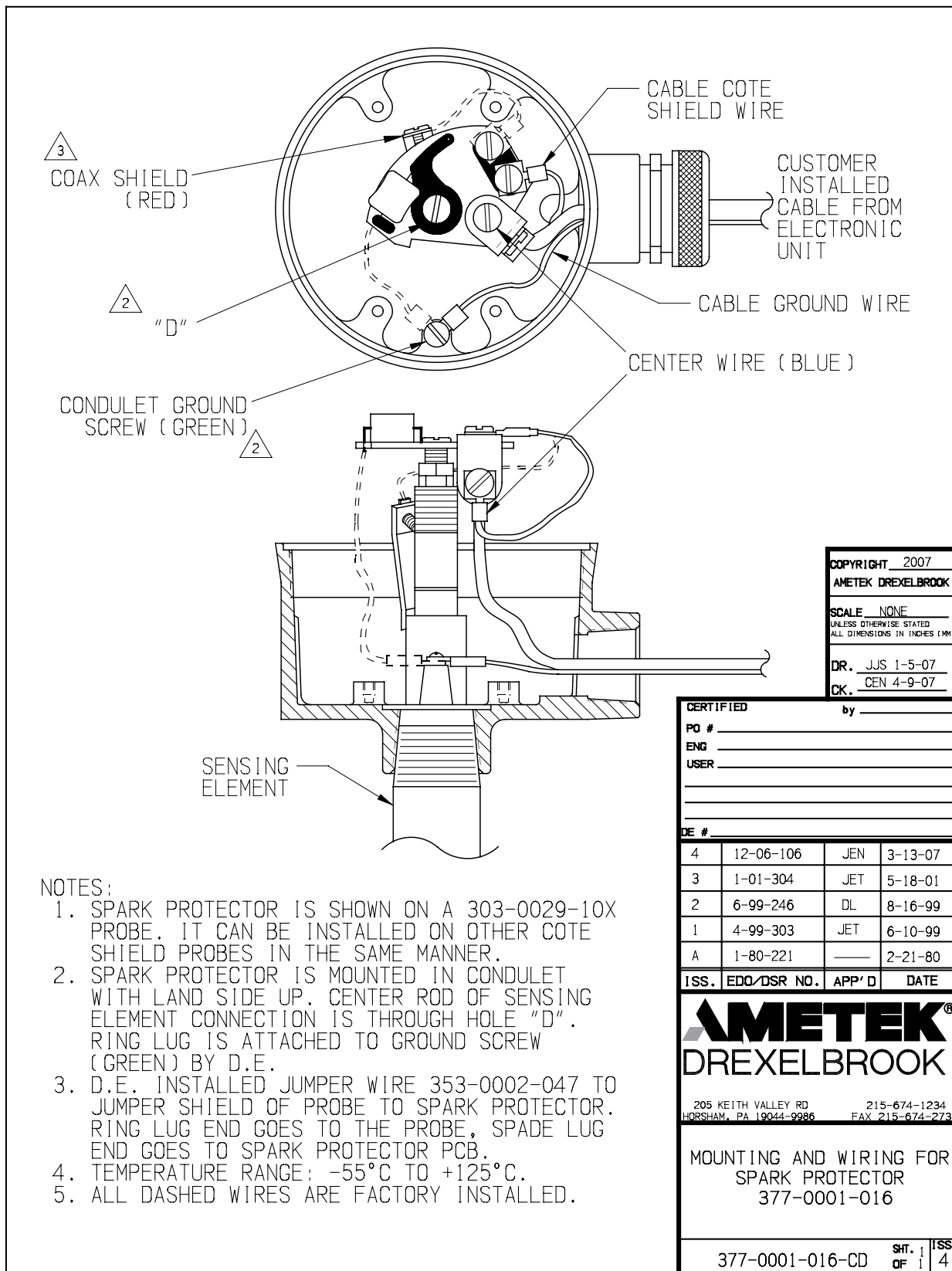
205 KEITH VALLEY RD
HORSHAM. PA 19044-9986

377-0001-019 HEAVY DUTY
SPARK PROTECTOR
CUSTOMER CONNECTION
MOUNTING & WIRING

377-0001-019-CD	OF 2	5
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[illegible]

7.5 Mounting and Wiring for Spark Protector (Continued)



7.6 Adding a Padded Capacitor

NO. 330-0009-022-CD

SHT 1 OF 3

ADDING A PADDED CAPACITOR:
THE TUNING RANGE OF EACH POINT LEVEL SWITCH IS LIMITED. LONG INSERTION LENGTH SENSING ELEMENTS OR SENSING ELEMENTS MOUNTED IN PIPES OR NEAR METAL OBJECTS MAY GENERATE ENOUGH STANDING CAPACITANCE TO EXCEED THE TUNING RANGE OF THE SWITCH.

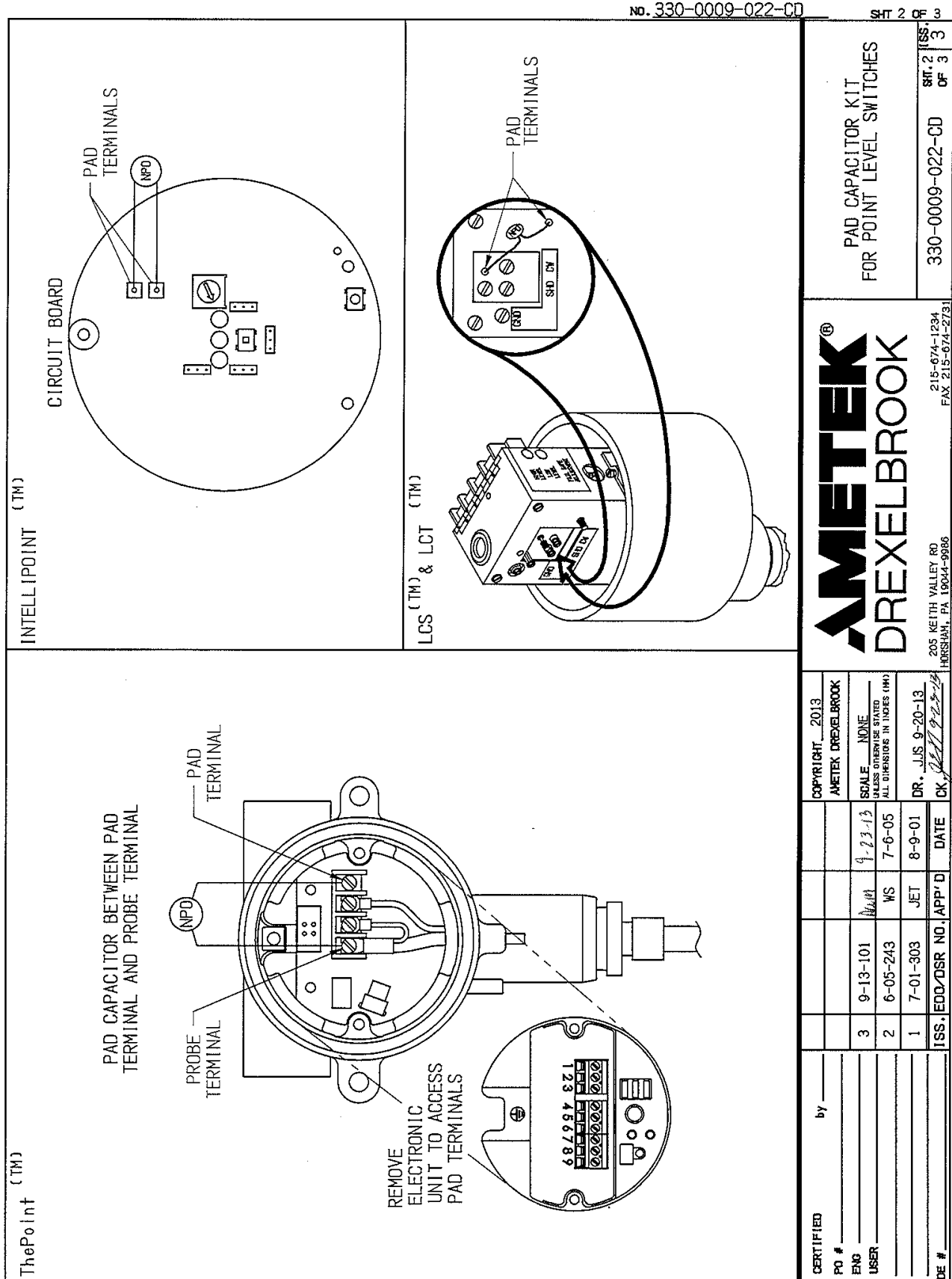
THE ADDITION OF AN EXTERNAL PADDING CAPACITOR WILL INCREASE THE TUNING RANGE OF THE UNIT. TUNING RANGES AND EXAMPLES OF INCREASES CAN BE FOUND FOR EACH TYPE OF POINT LEVEL ELECTRONIC SWITCH ON SHEET THREE.

WHEN A PADDING CAPACITOR IS REQUIRED, AN NPO CAPACITOR SHOULD BE ADDED TO THE PADDING TERMINALS AS INDICATED ON SHEET 2. ADDITIONAL PADS CAN BE ADDED IN PARALLEL UNIT A SATISFACTORY TUNING RANGE IS REACHED. IF A TUNING RANGE CANNOT BE REACHED, OR, IF PADDING IS IN EXCESS OF THE MAXIMUM RECOMMENDED TUNING RANGE AS INDICATED IN THE TABLE ON SHEET 3, PLEASE CONTACT THE FACTORY SERVICE DEPARTMENT.

NOTE: ON SOME TRANSMITTERS, THE PAD CAPACITOR IS SOLDERED TO TURRETS. OTHER TRANSMITTERS ATTACH THE LEADS UNDER SCREWS.

CERTIFIED		by		COPYRIGHT 2013		AMETEK DREXELBROOK	
PO #							
ENG							
USER							
DE #							
3	9-13-101	WS	7-6-05	DATE	8-9-01	ISS.	EDD/DSR NO. APP'D
2	6-05-243	WS	7-6-05	DATE	8-9-01	ISS.	EDD/DSR NO. APP'D
1	7-01-303	JET	8-9-01	DATE	8-9-01	ISS.	EDD/DSR NO. APP'D
				DR. JJS 9-20-13			
				CK. 9-25-13			
				205 KEITH VALLEY RD HORSHAM, PA 19044-9886			
				215-674-1234 FAX 215-674-2731			
				AMETEK® DREXELBROOK			
				PAD CAPACITOR KIT FOR POINT LEVEL SWITCHES			
				330-0009-022-CD			
				SHT. 1 OF 3			

7.6 Adding a Padded Capacitor (Continued)



7.6 Adding a Padded Capacitor (Continued)

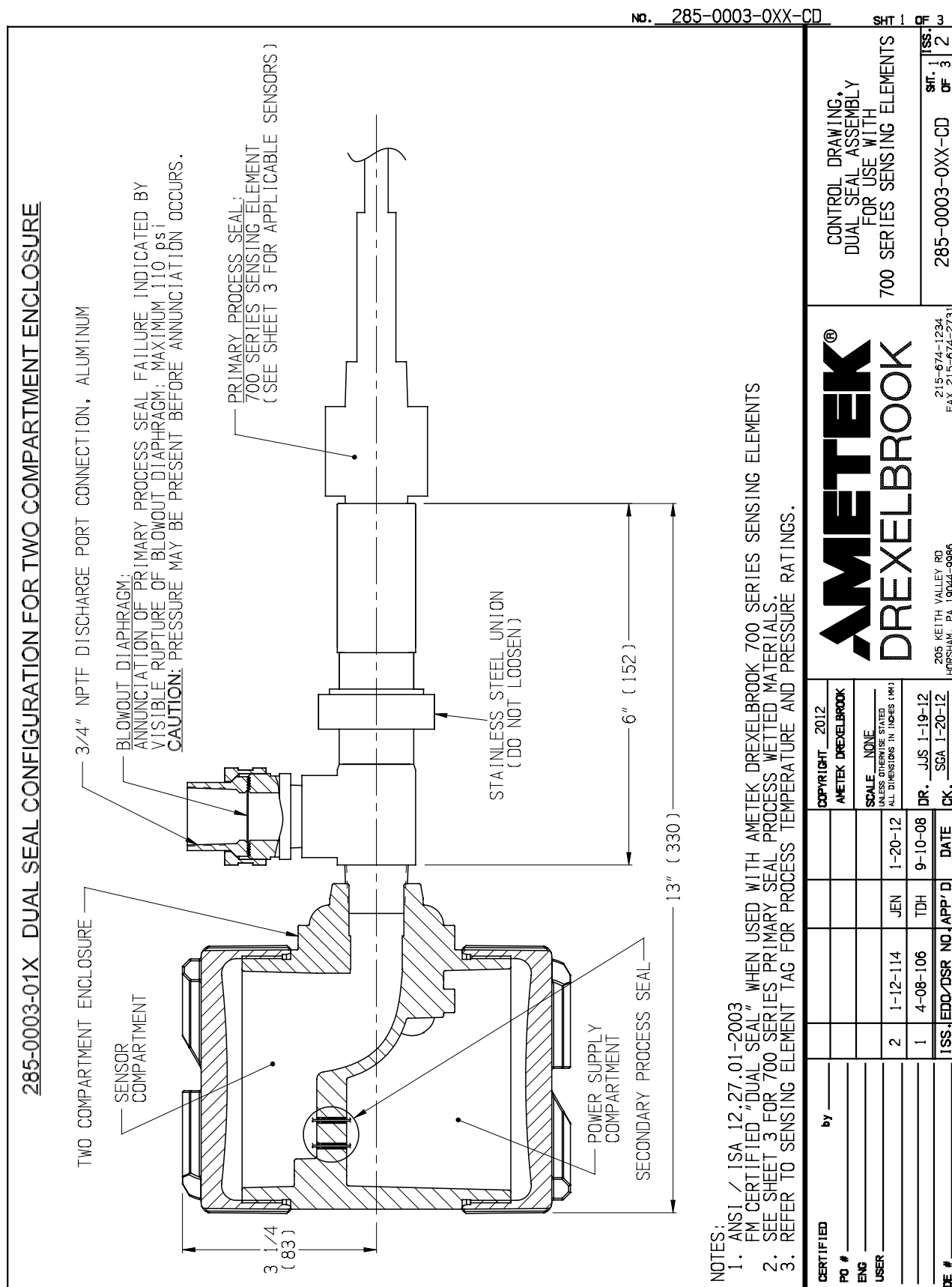
NO. 330-0009-022-CD

SHEET 3 OF 3

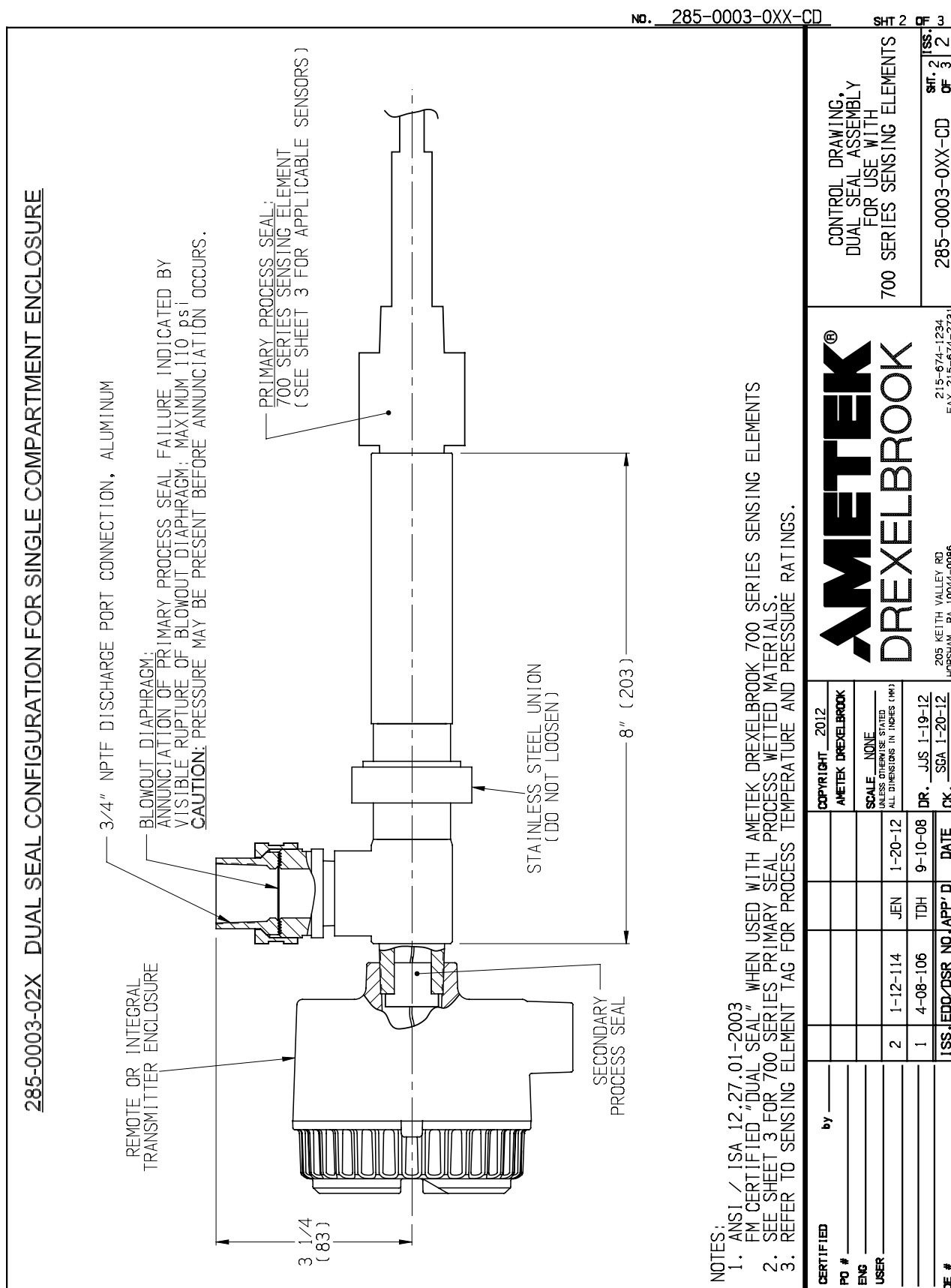
PRODUCT	SENSITIVITY	MODEL NUMBERS	UN-PADDED TUNING RANGE	PADDING RATIO	PADDING EXAMPLE	MAX RECOMMENDED TUNING RANGE
THE POINT™ LINE POWERED	HIGH	PHL, PPL, PGL	0 TO 25pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 35pF	50 TO 75pF
THE POINT™ LINE POWERED	STANDARD	PNL, PLL, PTL, PVL, PML	0 TO 60pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 70pF	120 TO 180pF
THE POINT™ TWO WIRE	HIGH	PHT, PPT, PGT	0 TO 25pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 35pF	50 TO 75pF
THE POINT™ TWO WIRE	STANDARD	PNT, PLT, PTT, PVT, PMT	0 TO 60pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 70pF	120 TO 180pF
INTELLIPOINT™ LINE POWERED AND TWO WIRE	HIGH	RHL, RPL, RGL, RHT, RPT, RGT	0 TO 25pF	4.33:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 43pF TO 68pF	50 TO 75pF
INTELLIPOINT™ LINE POWERED AND TWO WIRE	STANDARD	RNL, RLL, RTL, RVL, RML, RNT, RLT, RTT, RVT, RMT	0 TO 100pF	4.33:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 43pF TO 143pF	200 TO 300pF
LCS	HIGH	406-6020, 406-6022	0 TO 8pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 18pF	16 TO 24pF
LCS	STANDARD	406-6000, 406-6002	0 TO 90pF	3:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 30pF TO 120pF	180 TO 270pF
LCT	HIGH	406-6220, 406-6222	0 TO 8pF	1:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 10pF TO 18pF	16 TO 24pF
LCT	STANDARD	406-6200, 406-6202	0 TO 90pF	3:1	ADDING A 10pF CAP WILL CHANGE THE RANGE TO 30pF TO 120pF	180 TO 270pF

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PO # _____	3 9-13-101	DATE 6-9-13	SCALE NONE	ISS. 3 OF 3	330-0009-022-CD
ENG _____	2 6-05-243	DATE 7-6-05	UNLESS OTHERWISE STATED ALL DIMENSIONS IN INCHES (IN)	215-674-1234 FAX 215-674-2731	
USER _____	1 7-01-303	DATE 8-9-01	DR. JUS 9-20-13		
DE # _____	ISS. 1	EDD/DSR NO. APP'D	OK, JUS 9-23-13		

7.7 Dual Seal Assembly for 700 Series Sensing Elements



7.7 Dual Seal Assembly (Continued)



NO. 285-0003-0XX-CD

SHT 3 OF 3

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0001-022	TFE/316SS
700-0001-024	TFE/316SS
700-0001-026	TFE/316SS
700-0001-034	TFE/CS
700-0001-040	POLYETHYLENE/316SS
700-0001-044	PFA/316SS
700-0001-054	TFE/316SS
700-0001-064	TFE/316SS
700-0001-074	TFE/316SS
700-0001-344	PFA/316SS
700-0002-023	TFE/316SS
700-0002-024	TFE/316SS
700-0002-027	FEP/TFE/316SS
700-0002-028	TFE/316SS
700-0002-033	TFE/316SS
700-0002-037	PVDF/TFE/316SS
700-0002-040	UHMW PE/SILICONE/316SS
700-0002-044	PVDF/TFE/316SS

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0002-054	FEP/TFE/316SS
700-0002-057	PVDF/TFE/316SS
700-0002-064	PVDF/TFE/316SS
700-0002-224	TFE/316SS
700-0002-321	FEP/TFE/316SS
700-0002-360	PFA/TFE/316SS
700-0005-054	PFA/TFE/316SS
700-0201-005	TFE/316SS
700-0201-025	TFE/316SS
700-0201-026	TFE/316SS
700-0201-027	TFE/316SS
700-0201-028	TFE/316SS
700-0201-035	TFE/316SS
700-0201-051	TFE/316SS
700-0201-052	TFE/316SS
700-0201-058	TFE/316SS
700-0201-059	TFE/316SS
700-0202-002	TFE/316SS

SENSOR MODEL #	PRIMARY SEAL WETTED MATERIALS
700-0202-053	TFE/316SS
700-0202-054	TFE/316SS
700-0202-056	TFE/316SS
700-1202-001	PEEK/316SS
700-1202-010	PEEK/316SS
700-1202-014	PEEK/316SS
700-1202-015	PEEK/316SS
700-1202-018	PEEK/316SS
700-1202-031	PEEK/316SS
700-1202-033	PEEK/316SS
700-1202-041	PEEK/316SS
700-1202-045	PEEK/316SS
700-1202-051	PEEK/316SS
700-1202-055	PEEK/316SS
700-1202-061	PEEK/316SS
700-1202-081	PEEK/316SS
700-9100-403	PEEK/316SS
700-9100-404	PEEK/316SS

METEK® DBEXEL BOOK

215-674-1234
FAX 215-674-2731

205 KEITH VALLEY RD
HORSHAM, PA 19044-9986

CONTROL DRAWING.
DUAL SEAL ASSEMBLY
FOR USE WITH
7000 SERIES SENSING ELEMENTS

285-0003-0XX-CD

CERTIFIED	by _____					COPYRIGHT 2012
PO #	_____					AMETEK DREXELBROOK
ENG	_____					
USER	_____					SCALE NONE
						UNLESS OTHERWISE STATED
						ALL DIMENSIONS IN INCHES (MM)
		2	1-12-114	JEN	1-20-12	
		1	4-08-106	TDH	9-10-08	DR. JUS 1-19-12
		ISS	EDD/USB	NO	APP/D	DATE
						SSA 1-20-12

Appendix: A

Shortening or Lengthening Sensing Element



CAUTION:
The insulation length of either **Flush Sensing Elements** or **Insulated Sensing Elements** can **NOT** be changed. **Cable Sensing Elements** can only be shortened. Instructions are included with each unit.

The Need

Sometimes your application calls for probe lengths other than the standard 18-inch or longer insertion lengths supplied. Shortening the sensing element is quite simple and can be done in the field. Lengthening the sensing element, however, is more difficult because the metal rod, typically 304SS or 316SS, must be welded.

Before making any Adjustments:

- 1) Read the following instructions thoroughly.
- 2) Remove power.
- 3) Disconnect the electronics.
- 4) Protect electronics from any static discharge.
- 5) Protect electronics from any heat.

Shortening

The bare metal center rod of the sensing element can be shortened with a hacksaw. Be careful not to cut either of the two insulators. See Figure on this page.

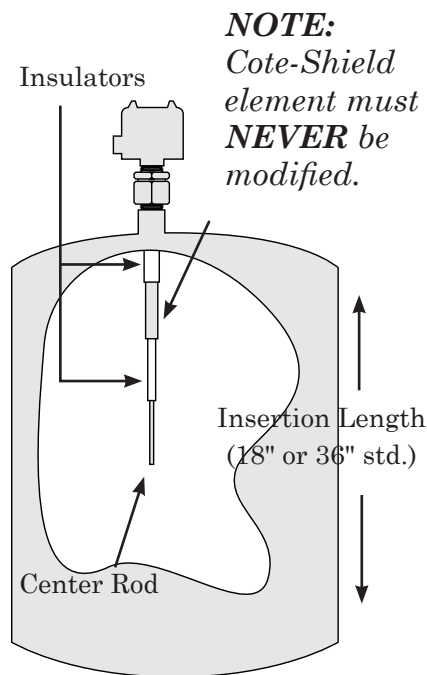
In applications using conductive or water-based materials, shortening is not a problem. Leave a minimum bare metal center rod length of two (2) inches.

For dry granular materials, such as powder, sand, corn, clinker, etc., you must leave a minimum bare metal center rod length of eight (8) inches. Consult the factory before shortening beyond this point.

Lengthening

To lengthen the sensing element, an extension rod can be welded onto the end of the bare metal center rod. Make sure that the extension rod is the same metal as the sensing element.

An alternate option is to add a pipe coupling and a section of metal pipe after threading the tip of the sensing element. In this case, the metal pipe need not be identical to the metal of the sensing element.



Note:
Any changes to probe length after calibration requires recalibration to ensure proper operation.

CE Installation Supplement

Purpose: To provide additional information that is required to be in compliance with the CE mark of conformity and EMC Directive 2004-108-EC

Definitions:

1. I/O Sensor/Measurement/Control Port – Any port which provides level measurement, control, and/or DC power.
2. I/O AC Power – Any port which provides AC main power to the instrument.
3. Housing – Any enclosure where the sensor and transmitter can be located.
4. Non-metallic applications – any application where the sensor is not surrounded by a metallic surface.

Installation Specifics:

1. I/O Sensor/Measurement/Control Ports
 - Wiring must be twisted pair and run in conduit or an equivalent shielded environment (i.e. shielded braid, cable, etc.).
 - The shield terminations must be grounded at the source and destination ports.
 - Wiring must be run separate from AC main power and/or any signal exceeding 75 volts DC or 50 volts AC.
2. I/O AC Power Port
 - Wiring must be run either in conduit or an equivalent shielded environment (i.e. shielded braid, cable, etc.).
 - The shield terminations must be grounded at the source and destination ports.

CE Installation Supplement (Continued)

3. Remote Installations

- Sensor port must be connected to the transmitter port by one of the following means:
 - 401-16-2 Probe Filter
 - Coaxial cable run in conduit
 - Triaxial cable

4. Housings

- All installations require the sensor and transmitter to be located in a closed shielded/metal housing (i.e. typically explosion-proof or weatherproof housings meet this requirement)

5. Sensor Type/Mounting

- In all non-metallic applications the sensor must have a full concentric shield (i.e. needs to be considered when ordering).
- The sensor/sensor conduit must be grounded locally either to a metal support structure or an equivalent earth ground.

Comments:

- Any deviation from these installation requirements should be reviewed with factory, prior to implementation
- These instructions are essential to insure conformity with specified EC directives

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GENERAL: *ALL ORDERS ARE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS. ANY ACCEPTANCE OF ANY OFFER OF BUYER FOR ANY GOODS OR SERVICES IS CONDITIONED UPON THESE TERMS AND CONDITIONS, AND SELLER OBJECTS TO ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY BUYER IN ANY DOCUMENT, WHICH SHALL NOT BE BINDING UPON SELLER.* No salesman or other party is authorized to bind the AMETEK DREXELBROOK Division of AMETEK, Inc. (hereinafter "Seller") by any agreement, warranty, statement, promise, or understanding not herein expressed, and no modifications shall be binding on Seller unless the same are in writing and signed by an executive officer of Seller or his or her duly authorized representative. Verbal orders shall not be executed until written notification has been received and acknowledged by Seller.

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CREDIT: Seller reserves the right at any time to revoke any credit extended to Buyer or otherwise modify terms of payment if Buyer fails to pay for any shipments when due or if in Seller's opinion there is a material adverse change in Buyer's financial condition. Seller may, at its option, cancel any accepted Order if Buyer fails to pay any invoices when due.

DELIVERY: Shipments are F.O.B place of manufacture ("Shipping Point") and the Buyer shall pay all freight, transportation, shipping, duties, fees, handling, insurance, storage, demurrage, or similar charges from Shipping Point. Delivery of goods to common carrier shall constitute delivery and passing of title to the Buyer, and all risk of loss or damage in transit shall be borne by Buyer. Any claims or losses for damage or destruction after such delivery shall be the responsibility of Buyer.

Seller reserves the right to make delivery in installments which shall be separately invoiced and paid for when due, without regard to subsequent deliveries. Delay in delivery of any installment shall not relieve Buyer of its obligation to accept remaining deliveries.

Acknowledged shipping dates are approximate only and based on prompt receipt of all necessary information from Buyer and Buyer's compliance with terms of payment.

TAXES: All sales, excise and similar taxes which Seller may be required to pay or collect with respect to the goods and/or services covered by any Order, shall be for the account of the Buyer except as otherwise provided by law or unless specifically stated otherwise by Seller in writing.

TERMINATION AND HOLD ORDERS: No Order may be terminated by Buyer except upon written request by Buyer and approval by Seller, and if said request is approved by Seller, under the following conditions: (1) Buyer agrees to accept delivery of all of the units completed by Seller through the workday on which Seller receives the written termination request; (2) Buyer agrees to pay to Seller all direct costs and expenses applicable to the portion of the Order that is incomplete.

WARRANTY:

A. **Hardware:** Seller warrants its goods against defects in materials and workmanship under normal use and service for one (1) year from the date of invoice.

B. **Software and Firmware:** Unless otherwise specified, Seller warrants for a period of one (1) year from date of invoice that standard software or firmware, when used with Seller specified hardware, shall perform in accordance with Seller's published specifications. Seller makes no representation or warranty, expressed or implied, that the operation of the software or firmware shall be uninterrupted or error-free, or that functions contained therein shall meet or satisfy the Buyer's intended use or requirements.

C. **Services:** Seller warrants that services, including engineering and custom application, whether provided on a fixed cost or time and material basis, shall be performed in accordance with generally accepted industry practices.

D. **Remedies:** Seller's liability under this section is restricted to replacing, repairing, or issuing credit (at Seller's option) for any returned goods and only under the following conditions: (1) Seller must be promptly notified, in writing, as soon as possible after the defects have been noted by the Buyer, but not later than (1) year from date of invoice from Seller; (2) The defective goods are to be returned to the place of manufacture, shipping charges prepaid by the Buyer; (3) Seller's inspection shall disclose to its satisfaction that the goods were defective in materials or workmanship at the time of shipment; (4) Any warranty service (consisting of time, travel and expenses related to such services) performed other than at Seller's factory, shall be at Buyer's expense.

E. **Repaired/Reconditioned Goods:** As to out-of-warranty goods which Seller has repaired or reconditioned, Seller warrants for a period of sixty (60) days from date of its invoice only new components replaced in the most recent repair/reconditioning.

F. **Returns and Adjustments:** No goods may be returned unless authorized in advance by Seller and then only upon such conditions to which Seller may agree. Buyer must obtain an RMA (Return Material Authorization) number from Seller prior to any return shipment and such RMA number must appear on the shipping label and packing slip. Buyer shall be responsible for the returned goods until such time as Seller receives the same at its plant and for all charges for packing, inspection, shipping, transportation, or insurance associated with returned goods. In the event that credit for returned goods is granted, it shall be at the lesser of the then current prices or the original purchase price. Claims for shortage or incorrect material must be made within five (5) days after receipt of shipment.

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Seller shall defend any lawsuit brought against the Buyer based on a claim that the design or construction of the goods sold hereunder by Seller infringe any United States or Canadian Patent, Copyright or Mask Work Registration, provided that Buyer promptly notifies Seller of such claim in writing and further provided that, at Seller's expense, (1) Buyer gives Seller the sole right to defend or control the defense of the suit or proceeding, including settlement, and (2) Buyer provides all necessary information and assistance for that defense. In the event of a charge of infringement, Seller's obligation under the agreement shall be fulfilled if Seller, at its option and expense, either (i) settles such claim; (ii) procures for Buyer the right to continue using such goods; (iii) replaces or modifies goods to avoid infringement; or (iv) accepts the return of any infringing goods and refunds their purchase price; or (iv) defends against such claim.

If Buyer furnishes specifications or designs to Seller, the obligations of Seller set forth above shall not apply to goods made by Seller using such specifications or designs, and Buyer shall defend, indemnify and hold Seller harmless against any third party claims for infringement which arise out of Seller's use of specifications or designs furnished by Buyer.

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FORCE MAJEURE: Seller shall not be responsible for delays in delivery or any failure to deliver due to causes beyond Seller's control, including but not limited to the following items: acts of God, war, terrorism, mobilization, civil commotion, riots, embargoes, domestic or foreign governmental regulations or orders, governmental priorities, port congestion, acts of the Buyer, its agents or employees, fires, floods, strikes, lockouts and other labor difficulties, shortages of or inability to obtain shipping space or transportation, inability to secure fuel, supplies or power at current prices or on account of shortages thereof, or due to limitations imposed by the extent of availability of Seller's normal manufacturing facilities.

If a delay excused per the above extends for more than ninety (90) days and the parties have not agreed upon a revised basis for continuing providing the goods or services at the end of the delay, including adjustment of the price, then Buyer, upon thirty (30) days' prior written notice to Seller may terminate the Order with respect to the unexecuted portion of the goods or services, whereupon Buyer shall promptly pay Seller its reasonable termination charges upon submission of Seller's invoices thereof.

LIMITATION OF LIABILITY: Seller's liability for any claim of any kind, except infringement of intellectual property rights, shall not exceed the purchase price of any goods or services which give rise to the claim. **SELLER SHALL IN NO EVENT BE LIABLE FOR BUYER'S MANUFACTURING COSTS, LOST PROFITS, LOSS OF USE OF THE GOODS OR SERVICES, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWNTIME COSTS, CLAIMS OF BUYER'S CUSTOMERS FOR DAMAGES, OR OTHER SPECIAL, PROXIMATE, INCIDENTAL, INDIRECT, EXEMPLARY OR CONSEQUENTIAL DAMAGES.** Any action against Seller must be brought within eighteen (18) months after the cause of action accrues. These disclaimers and limitations of liability shall apply regardless of the form of action, whether in contract, tort or otherwise, and further shall extend to the benefit of Seller's vendors, appointed distributors and other authorized resellers as third-party beneficiaries.

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NON-WAIVER BY SELLER: Waiver by Seller of a breach of any of these terms and conditions shall not be construed as a waiver of any other breach.

SEVERABILITY AND ENTIRE AGREEMENT: If any provision of these terms and conditions is unenforceable, the remaining terms shall nonetheless continue in full force and effect. This writing, together with any other terms and conditions Seller specifically agrees to in writing, constitutes the entire terms and conditions of sale between Buyer and Seller and supercedes any and all prior discussions, and negotiations on its subject matter.



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205 Keith Valley Road, Horsham, PA 19044
Telephone: 1 215-674-1234
Fax: 1 215-674-2731
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